ENVIRONMENTAL CONSULTING & MANAGEMENT

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August 5, 1994

Mr. Denis Zielinski
U.S. Environmental Protection Agency
814 Chestnut Street
Philadelphia, PA 19107-4431

Re: Facility Sewer System Stabilization Work Plan
Monsanto Nitro Plant

Dear Mr. Zielinski:

Roux Associates, Inc., on behalf of Monsanto, is submitting the attached Work Plan for a stabilization interim remedial measure for the Facility Sewer System at the above-referenced facility.

The stabilization measure includes upgrades to the process sewer lines at the plant, thus eliminating a potential source of releases to ground water. The Work Plan includes a general scope of work and schedule for implementation.

If you would like to discuss the plan in more detail, please call me at (609) 423-8800 or Ms. Christine Weber of Monsanto at (304) 759-4334.

Respectfully,
ROUX ASSOCIATES, INC.

Mark Tucker

Mark Tucker, P.G.
Principal Hydrogeologist/Project Manager

MT/de

cc: Mr. Max Robertson - West Virginia Department of Environmental Protection
Ms. Christine Weber - Monsanto

Stabilization Work Plan for Facility Sewer System
Monsanto Nitro Plant
August 5, 1994

1.0 INTRODUCTION

This Work Plan has been prepared to describe the general scope of work and schedule for implementation of a stabilization measure for the Facility Sewer System at the Monsanto Nitro Plant. A RCRA Facility Investigation (RFI) is being conducted at the facility which includes ground-water investigations associated with the Facility Sewer System. The stabilization measure is being implemented to accelerate the corrective action process.

A bar chart schedule prepared by Monsanto is provided in Figure 1 which provides a detail of the tasks required to implement the plan. The RFI and corrective action process for the remainder of the facility will proceed concurrently with the implementation of the stabilization measure. The site-wide corrective action process includes completion of the RFI; preparation of a risk assessment based on the RFI results; a completion of Corrective Measures Study; and design and implementation of the corrective action. It is anticipated that the stabilization measure for the Facility Sewer System will eventually be incorporated as part of the corrective action for the facility through the Corrective Measures Study.

The stabilization measure includes the following primary activities: a stabilization measures evaluation, stabilization measures design, and implementation. The stabilization measures implementation will be phased to address individual parts of the Facility Sewer System which serve different process areas. The stabilization measure activities are further described in the following sections.

2.0 STABILIZATION MEASURES EVALUATION

A stabilization measures evaluation will be conducted to assess various alternatives for upgrades to the various segments of the process sewers. Different segments of the sewer systems handle wastewaters with widely different characteristics including flow velocities, reaction potentials, and solids content. Various materials of construction will be evaluated based on the wastewater characteristics.

Alternative methods of construction to be evaluated include:

- replacement with above-ground pipelines;
- slip-lining of existing sewers;
- replacement of existing sewers underground; and
- replacement of sewers in a trench with secondary containment.

The above alternatives, and others if they become apparent, will be screened for the feasibility of implementation. Criteria to be considered will include:

- Monsanto employee health, safety, and engineering standards;
- ability to prevent or minimize releases to the environment;
- reliability and effectiveness;
- capital and operating costs;
- the presence of underground or aboveground physical obstructions;
- effects on plant operations; and
- long-term operation and maintenance requirements.

The evaluation will also include an assessment of options for combining the process sewer upgrades with other plant utility requirements. For example, the trench with secondary containment could carry other utilities such as steam lines, refrigeration lines, fire water systems, water system lines or electrical conduit.

As part of the stabilization measures evaluation, options for waste minimization will also be evaluated. This will include an assessment of options to reduce, modify, or eliminate wastewater streams through process modifications, conservation measures, or rerouting. As a result, segments of process sewer lines may be eliminated entirely.

At this time, it is anticipated that the non-process sewers which handle storm water will remain in service. This water is currently directed to the facility's wastewater treatment plant. For sewer replacement alternatives where existing process sewers remain in the ground, a plan for flushing of the sewers with stormwater will be developed.

After completing the stabilization measures evaluation, the appropriate alternatives will be selected for the various segments of the process sewer. The results of the evaluation will be described in a Stabilization Measures Evaluation Report to be submitted to USEPA. The report will provide a conceptual plan for addressing the entire process sewer system.

3.0 STABILIZATION MEASURES DESIGN

After completion of the stabilization measures evaluation and development of a conceptual plan, engineering design will commence. The design will include the layout of the system; pipe and pump specifications; and materials of construction for the various segments of the sewer system. Cost estimating will be conducted as part of funding procurement.

4.0 STABILIZATION MEASURES IMPLEMENTATION

The replacement of the sewer system will be conducted in phases corresponding to the major segments of the process sewer system. Each phase will have a final design phase where details on piping elevations, process equipment modifications, collection systems in process buildings, and tie-ins will be specified. Upon review and approval of the final design, the construction for the phase will be implemented. Thus, each phase will have a design element followed by review and approval and then construction.

Activities in the construction phases will overlap. While construction in one phase is ongoing, design of the next phase will also be ongoing. For example, during construction of Phase I, the Phase II final design will be developed and approved. In this way, construction of Phase II can proceed directly after construction of Phase I.

DETAILED SEWER STABILIZATION MEASURES PLAN

FLEXSYS NITRO FACILITY
No. 1 Monsanto Road
Nitro, West Virginia

November 27, 1996

Prepared for:
FLEXSYS AMERICA, LP
No. 1 Monsanto Road
Nitro, West Virginia

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1.0 INTRODUCTION

Roux Associates, Inc. was retained by FLEXSYS America LP (FLEXSYS) to develop this Detailed Sewer System Stabilization Measures Plan (Plan) for the FLEXSYS facility located in Nitro, West Virginia (facility). This Plan has been developed to fulfill certain requirements of the facility's November 2, 1990 Resource Conservation and Recovery Act (RCRA) Corrective Action Permit issued by the United States Environmental Protection Agency (USEPA) (Permit identification USEPA ID Number WVD 039990965). Specifically, the Corrective Action Permit identifies the Facility Sewer System as one of fourteen solid waste management units (SWMUs) to be addressed at the facility. The Facility Sewer System SWMU is being addressed individually to expedite the evaluation and implementation of a stabilization/corrective measures program for this unit. The proposed measures for the remaining thirteen facility SWMUs were described in the Stabilization Corrective Measures Study (SCMS) Report which was approved by the USEPA on July 1, 1996 and is currently being implemented by Monsanto Company (Monsanto). It is intended that this Plan for the Facility Sewer System be incorporated as part of the overall facility-wide corrective action program being implemented by FLEXSYS and Monsanto.

This Plan has been developed in accordance with the USEPA-approved Facility Sewer System Stabilization Work Plan dated August 5, 1994 and the Sewer Stabilization Measures Evaluation Report (Evaluation Report), dated May 30, 1995. The Evaluation Report presented the detailed analysis of the Facility Sewer System physical layout, described the wastewater characteristics, and presented a comparative analysis of conceptual sewer stabilization measure alternatives. The Evaluation Report also identified the following six elements to be further completed as part of the Facility Sewer System Stabilization Program:

- develop facility future production requirements;
- refine conceptual sewer stabilization alternatives;
- select optimum sewer stabilization alternative;
- develop proposed scope of work and necessary phasing;
- develop this Detailed Sewer System Stabilization Measures Plan; and,
- implement this Detailed Sewer System Stabilization Measures Plan.

This Plan summarizes the results of the first four elements, compiles the details and rationale for selection of the overall Sewer Stabilization Program, and presents the implementation schedule.

1.1 Project Overview

This Plan details the proposed Sewer Stabilization Program components which have been designed to satisfy appropriate RCRA Corrective Action Permit elements. It is engineered to be implemented in three distinct phases (Phases I through III) over a six-year time frame beginning in 1996. The project phases in order of implementation are: plantwide containment; segregation of wastes from Specialty Products; and the new main process sewer backbone. These phases are being implemented in priority order to maximize environmental benefit. Phase I - Plantwide Containment project elements include installation of dikes around remaining tanks, curbs around pumps, catch pans under unloading spots and consolidation of the number of unloading spots to minimize the potential of chemicals being released directly to the ground. Phase II - Specialty Products Collection and Segregation project elements include segregation and collection of oils and solids for outside disposal. The Phase II project will significantly reduce the overall amount of waste entering the sewer system. Phase III - New Main Process Sewer System includes a dual-contained in-ground gravity drain system. The new conveyance system will include integral leak detection and will be installed over four years. In years one and two, the main sewer line backbone from Specialty products to the equalization tanks will be designed and installed. In year three, remaining production unit containment elements will be installed and tied into the backbone. In the last year, a new dual-contained in-ground gravity drain line will be installed from the EQ tanks to the WTP. The existing sewer system will be retained and used for collection of stormwater, sanitary streams, condensate and deminimus waste streams.

1.2 Procedures for Modifications to this Plan

While it is FLEXSYS' intent to implement each of the above-referenced project elements (as described in detail in Section 4.0 of this document), minor modifications may be required for any number of reasons such as potential constructability issues which may be developed during final design or unforeseen changes in plant process unit configurations. In order to administratively account for these types of minor modifications to this plan, FLEXSYS and Monsanto will utilize routine communications with the USEPA (through conference calls, meetings, and site visits) to

gain approvals. The routine bimonthly progress reports submitted by the facility will be used as the means of documenting discussions with the USEPA.

1.3 Project Plan Organization

The remainder of this Plan is organized as follows. A site description is presented in Section 2.0. Descriptions of the existing Facility Sewer System infrastructure, wastewater sources and supplemental data collection activities completed to date are discussed in Section 3.0. Section 4.0 presents the details of the selected Sewer Stabilization Program. Sections 5.0 through 9.0 present the auxiliary plans for Project Management, Soil Management, Water Waste Management, Quality Assurance and Health and Safety. These auxiliary plans include soil sampling and waste characterization activities as appropriate to satisfy RCRA-related elements. The individual contractors, once selected, will be responsible for providing their own site-specific Health and Safety, and Quality Assurance Plans which focus on the construction elements as necessary to satisfy appropriate OSHA and/or other agency requirements.

2.0 SITE DESCRIPTION

This section presents a description of the facility, surrounding land use, plant history and physical setting.

2.1 General Facility Description

The facility is located on the east bank of the Kanawha River, approximately one-half mile north of the City of Nitro in Putnam County, West Virginia. A site location map from the United States Geological Survey (USGS) 7½-minute topographic quadrangle (Saint Albans) is included as Figure 1. A site plan showing property boundaries, site improvements, and surface topography is provided as Plate 1.

The facility comprises approximately 116 acres, 60 percent of which is currently utilized for production areas, warehouse buildings, parking areas, or storage. The remaining 40 percent is unimproved. The facility is divided into two major areas: the northern area (approximately 46 acres) is designated the Waste Treatment Area, and the southern area (approximately 70 acres) is designated the Process Area.

As shown on Plate 1, Interstate Highway 64 separates the Waste Treatment Area from the Process Area. The facility is bordered to the east and northeast by commercial properties on State Route 25. The facility is bounded to the south by current and former manufacturing facilities, while the Kanawha River borders the property to the west and northwest.

A variety of aboveground and underground utilities exist at the facility including electric, steam, potable water, fire water, natural gas, process piping, and sewers.

2.2 Plant History

In 1917, the United States government awarded a contract to the Thompson Starralt Company to build a munitions plant and housing for 10,000 to 20,000 employees and soldiers in support of World War I. The munitions plant included over 730 buildings. In 1918, the Hercules Powder Company began manufacturing explosives including "nitro-powder" at the munitions plant. A town grew around the munitions plant, and the town derived its name from the principle product,

"Nitro". In 1921 the plant closed due to the reduced need for its principal product at the end of World War I. The Charleston Industrial Corporation purchased the entire munitions plant and sold parcels of the facility to, among others, the Seydel Company, the Rubber Services Company, and the Nitro Pulp Company. A large number of industries grew from the individual parcels.

In 1929 Monsanto acquired Rubber Services Laboratory which manufactured chloride, phosphate, and phenolic compounds at the facility. Flotation agents, pickling inhibitors, anti-oxidants, anti-skinning, wetting agents, and oils were each added to the existing operations in the early 1930s. Monsanto continued to expand operations at the Nitro facility and accelerated the facility's growth in the 1940s.

The manufacture of rubber chemicals initially comprised the majority of the facility's business, accounting for approximately 65 percent of operations. The facility now produces anti-oxidant chemicals and rubber chemicals as the principal operations.

As of May 1, 1995, operation of the Nitro facility and management of the entire site and substantially all of its assets (except the improved real estate and certain limited manufacturing assets) were transferred to FLEXSYS America, LP (FLEXSYS), a limited partnership. The facility RCRA Corrective Action Permit has been modified to reflect Monsanto Company and FLEXSYS as co-permittees.

2.3 Physical Setting

The following descriptions of the facility's physical setting are based on published maps, reports, and information obtained from facility investigations.

2.3.1 Topography and Surface-Water Drainage

The facility is situated on top of an alluvial terrace. The site topography is relatively flat with total relief of less than 10 feet except along the riverbank. The riverbank is a steep slope which has a drop in elevation of between 20 and 30 feet along the riverfront. The highest elevation is approximately 590 feet above Mean Sea Level (MSL), occurring at the southern boundary. The topography is not expected to present any problems for sewer stabilization measures.

The Process Area is largely covered by buildings and asphalt, and surface-water runoff in the manufacturing areas is directed into catch basins which are part of the existing Facility Sewer System for treatment in the Wastewater Treatment Plant (WTP). Runoff from non-manufacturing areas, such as parking lots, is directed to storm drains of the stormwater sewer system which eventually discharges to the Kanawha River. A portion of the runoff flows through an oil/water separator prior to discharging to the Kanawha River. The low flood control levee along the riverbank prevents overland flow from reaching the Kanawha River.

Only a small portion of the Waste Treatment Area is covered with asphalt, while the remainder is covered with vegetation consisting of grass and shrubbery growth. Most precipitation directly infiltrates into the soil. Some drainage ditches and subsurface drains exist which collect and discharge runoff to the Kanawha River.

The surface water drainage will be maintained throughout implementation of sewer stabilization measures.

2.3.2 Geology and Hydrogeology

The alluvial terraces along the Kanawha River are underlain by unconsolidated alluvial deposits consisting predominantly of sand, silt and clay with minor gravel. The thickness of these alluvial deposits typically ranges between 30 and 60 feet in the vicinity of Nitro. The grain size of the alluvial deposits coarsens downward with silt and clay found mostly at top of the deposits, and medium to coarse sand with gravel more predominant near the base. Fill material is also encountered at depths ranging from 2 to 25 feet in many parts of the facility. In general, geology is not expected to complicate sewer stabilization measures.

The alluvial deposits of the Kanawha River Valley contain the uppermost aquifer at the facility. The aquifer is unconfined, and the depth to ground water generally varies from 15 to 20 feet below land surface (BLS) across the facility. Isolated zones containing perched water of fine-grained surficial soils and localized clay beds may be present. Although considerable variability occurs in sediment type in the alluvial deposits, the ground water within the alluvial deposits is interconnected and behaves as one aquifer. Ground water in the alluvial deposits beneath the facility flows toward the Kanawha River. As the depth to ground water generally exceeds the depth

of the proposed activities, dewatering issues are not expected to be a major component of sewer stabilization measures.

3.0 FACILITY SEWER SYSTEM DESCRIPTION

This section presents the critical characteristics of the existing sewer system configuration, including a description of the general layout and individual process wastewater sources. Discussions of ancillary equipment used for wastewater storage, treatment and control instrumentation are also presented as they are critical components in the Sewer Stabilization Measures Program. Lastly, this section includes a summary of supplemental data collection activities which have been completed to date for the Sewer Stabilization Measures Program.

3.1 General Sewer System Description

The existing Facility Sewer System consists of two separate systems: a storm-sewer system, and a combined sewer system. The layout of each system is shown on Plate 2. Only the general layout is presented below. Details of the system physical data (diameters, elevation, construction, etc.) were previously compiled and provided in the Evaluation Report.

The dedicated storm sewers are located in the northern portion of the Process Area and collect only stormwater from non-production areas (i.e., parking lots, warehouses) via catch basins and convey the stormwater by gravity to the Kanawha River. The majority of non-production area stormwater passes from the Process Area through an oil/water separator prior to discharging to the Kanawha River through Outfall 008. The remainder of non-production area stormwater (which is not directed to Outfall 008) is directed to the combined sewer system for treatment at the WTP as described below.

The combined sewer system exists primarily in the southern portion of the Process Area and collects process and non-process (stormwater, sanitary, and miscellaneous) wastewater into feeder piping which discharges to sewer mains. The wastewater flows via gravity in the underground sewer mains generally southward to an east-west interceptor. The wastewater flows westward in the interceptor sewer to the trunk sewer main which runs parallel to the Kanawha River and conveys the wastewater northward to Lift Station Number 1. Lift Station Number 1 pumps the wastewater into a series of aboveground storage tanks (see Section 3.2 below). Wastewater flows from these storage tanks into a gravity sewer main, which conveys the wastewater generally northward to Lift Station Number 2. Lift Station Number 2 pumps the wastewater into the WTP.

The treated wastewater is discharged via Outfall 001, in accordance with the facility's National Pollutant Discharge Elimination System (NPDES) permit (Permit WV0000868).

3.2 Wastewater Storage and Treatment

Lift Station Number 1 pumps the wastewater to two equalization tanks, two stormwater tanks, and one diversion tank. The stormwater tanks and diversion tank are each approximately one million-gallon capacity, aboveground, steel tanks. The two equalization tanks are each approximately 1.25 million-gallon capacity, aboveground, glass lined, steel tanks. The equalization tanks are used to temporarily store the wastewater and normalize the flowrate to the WTP. The stormwater tanks were constructed in 1988 and are used to provide peak storage capacity during precipitation events. The facility reports that the existing wastewater storage system is performing adequately. As a result, the selected stabilization measures for sewers is premised on maintaining consistent utilization of the existing wastewater storage components.

Pretreatment is accomplished at Lift Station Number 1 through a pH control system consisting of pH analyzers and caustic and acid addition units. The pH control system moderates the pH in the wastewater as it is pumped out of Lift Station Number 1. Lift Station Number 1 is also equipped with an oil collection system. Collected oil is occasionally removed from this system by tanker trucks and properly disposed. Additionally, the equalization and diversion tanks are equipped with mixers which provide pretreatment by mixing of more concentrated wastewater with less concentrated wastewater.

The WTP provides the principal treatment of facility wastewater. The WTP is located in the Waste Treatment Area and consists of activated sludge treatment with secondary and tertiary clarifiers. The pH of wastewater flowing into the activated sludge basin is further moderated by a pH control system similar to that described for Lift Station Number 1. The activated sludge unit consists of one basin with associated pumps, liquor addition units, mixers, blowers, and aerators. The secondary and tertiary clarifiers consist of the clarifier unit and associated pumps, rakes, and anti-foam agents. Sludge produced from the treatment process is thickened, then removed by tanker trucks for on-site disposal by incineration in a facility boiler. The sludge thickener was recently installed to replace the sludge digester in order to improve effluent quality.

3.3 Process Instrumentation and Control

Total carbon (TC) and pH analyzers are installed at the Lift Station No. 1 to monitor wastewater characteristics. Additionally, flow and level switches are installed at each lift station, in the storage tanks, and throughout the WTP to control wastewater flow and system operations.

Process control is aided by sophisticated automated equipment including: ProVOX control units in Building 44 and the WTP; a UNIVOX system in Building 34; and an Allen Bradley PLC in Building 91-1. Upgraded in 1990, these process control units minimize swings in temperature and pressure of waste streams to the WTP, prevent vessel overflows, and enhance oil-water separation.

3.4 Wastewater Sources

Facility wastewater is generated from both process and non-process sources. Process wastewater is generated in Process Area buildings. Non-process wastewater includes stormwater, sanitary waste water, non-contact cooling water, and steam condensate. Non-process wastewater is generated at a number of locations across the facility. Process and non-process wastewater sources are discussed in the following sections. Principal process descriptions, including a brief discussion of wastewater characteristics generated from each process, were previously compiled and provided in the Evaluation Report.

3.4.1 Process Wastewater

Process wastewaters are currently generated in five individual process units, in Buildings 34, 41, 47, 48, and 91. Construction of a new dedicated process sewer line which connects these five Buildings to the existing WTP is the focal point of the Stabilization Measures Program described in Section 4.0.

3.4.2 Sanitary Wastewater

Sanitary wastewater is generated as a result of potable water use and disposal as a result of normal human activity. Sanitary wastewater is generated at the following Buildings: 1, 3, 7, 13, 19, 25, 26, 35, 40, 41, 44, 49, 57, 66, 68, 69, and 93. Sanitary wastewaters will continue to be directed to the existing Facility Sewer System and WTP.

3.4.3 Miscellaneous Non-Process Wastewater

Miscellaneous non-process wastewater streams contribute to the existing sewer system. Steam is supplied to many of the buildings at the facility to support production or to provide heat. Condensate from the steam system discharges into the combined sewer system. Additionally, several buildings (primarily warehouses) are connected to the existing sewer system via floor drains, including Buildings 7, 9, 25, 31, 43 and 68. Miscellaneous non-process wastewater streams will continue to be directed to the existing Facility Sewer System and WTP.

3.4.4 Wastewater from Containment Areas

Many of the facility aboveground storage tanks (ASTs), pumps and loading/unloading areas contribute to the existing sewer system.

3.5 Supplemental Data Collection and Evaluation Activities Completed to Date

Preliminary activities including: development of existing sewer physical details; identification of wastewater sources and characteristic and evaluations of potential stabilization measures, were performed in accordance with the USEPA-approved Facility Sewer System Work Plan. Results of these preliminary activities were summarized in the Evaluation Report which was submitted to the USEPA in May 1995. The Evaluation Report also outlined the types of supplemental data collection activities which needed to be completed before individual project elements could be developed for Sewer Stabilization Measures Program. The supplemental data collection and evaluation activities completed to date include:

- Field inventory of all plant loading/unloading areas (railroad and truck):
- Field inspection of all AST containment areas;
- Evaluation of loading/unloading operations and development of a consolidation plan and recommendations for containment improvements;
- Evaluation of AST containment areas and development of recommendations for improvements to be included as part of the Sewer Stabilization Measure Program;
- Development of a comprehensive Environmental Matrix which lists regulatory programs which are potentially applicable to the storage, handling and treatment of plant chemicals;
- Identification of potential waste minimization, source control and/or pretreatment opportunities which could be integrated into the Sewer Stabilization Measures Program.

- Field inventory of all wastewater sources and identification of associated pipe, sump and sewer routing;
- Development and implementation of treatability studies to assist in the evaluation of feasible waste minimization pretreatment methods; and
- Development of guiding design premises to be used for front-end engineering.

These supplemental activities allowed for the development of the Comprehensive Sewer Stabilization Measures Program as described in Section 4.0.

4.0 SELECTED SEWER STABILIZATION MEASURES PROGRAM

This section presents the details of the overall Sewer Stabilization Measures Program to be implemented at the Nitro facility. This program has been developed and is intended to fulfill the requirements of the November 1996 submittal agreed to in the original Sewer Work Plan. At this stage, the project designs are at the 30% preliminary design level and are based on current design data. As the project evolves during the implementation phase, FLEXSYS will take advantage of any new data or operational considerations that may arise in order to optimize the existing design. It is FLEXSYS's intent to initiate completion of designs upon USEPA approval of this document and move forward with implementation according to the schedule discussed in Section 4.3. Plates 1 through 3 present the existing Site Plan, Existing Sewers Layout, and the New Process Sewer System Configuration and Layouts, respectively.

4.1 Design Objectives

As discussed in the Evaluation Report, this project is premised on fulfilling RCRA stabilization objectives, but is also based on compliance with numerous other regulatory and plant operational requirements (both existing and future). Concurrent with the completion of supplemental data collection activities (described in Section 3.5), FLEXSYS assembled a highly qualified task force which included engineers, contractors and permit regulatory specialists (see Table 1). Through a series of project scoping meetings, this task force developed the following design premises and objectives to guide selection of individual Sewer Stabilization Measures Program project elements:

Scope Boundaries

- This project will minimize, where feasible, the input of process wastewaters to the new process sewer system with due consideration to current and future regulations.
- This project will include containment improvements for unloading spots, dikes, roof drains, sanitary waste, uncontained storage areas, where discharges could be potentially impacted.
- Curbing and/or other methods will be employed to segregate potentially-impacted stormwater and direct it to the new process sewer. Stormwater from non-process areas will go into the existing sewer system and be treated at the WTP.
- This project will incorporate secondary containment and integral leak detection monitoring systems for all new process sewer lines.

- This project will address source reduction or pretreatment of B-91-2 Santovar Acid Drain; Collection and separation of oils at B-91, and solids separation at B-47.

- Condensate and blowdown from the boiler house and steam distribution system will continue to be directed to the existing sewer system.

Capacity-Related:

- The future plant production projections indicate continued downsizing and include shutdowns of former process units in Buildings 14 and 42. Waste loads associated with those two operations will be shed.

- New facilities requiring additional waste handling capacity are under evaluation. The system will be designed for current processes, but will allow for cost-effective introduction of new products.

- Adequate capacity from the lift station to the WTP will be provided to maintain nameplate capacity (1500 GPM).

Regulatory-Related

- Project must satisfy the RCRA Corrective Action Permit and NPDES Permit requirements.

- Compliance with OSHA regulations is a must.

- Zero injuries or incidents is the plant goal for personnel safety.

- Project does consider future air regulations and where feasible is designed to meet those anticipated regulations (e.g., Control Technique Guidelines for Waste Water Sources and MACT standards similar to Waste Water HON).

4.2 Primary Project Elements

The selected Sewer Stabilization Measures Program includes three primary project elements: plantwide containment; specialty products collection and segregation; and a new main process sewer system. Details of each of these project elements are presented in subsections 4.2.1 through 4.2.3 below. Preliminary Design Drawings are provided in Appendix A.

4.2.1 Phase I - Plant Containment Measures

The initial area of consideration in the sewer Stabilization Measures Program involves improvements to the loading/unloading areas, transfer pumps and storage tanks, to reduce the risk of environmental impact. The analysis of which areas warrant improvement in containment features began with a comprehensive inventory and field verification task. Over the course of several site inspections to prepare a detailed field inventory of the existing facilities, project

premises were developed to establish which areas are recommended for improvements. These premises are as follow:

- Chemicals cannot be discharged into any sewer that would flow into existing sewers which discharge to Outfall 008.
- Improvements will be constructed for storage and/or handling areas which potentially contain P, U and F listed wastes.
- Consolidation of loading/unloading stations will be performed where feasible.
- Any improvements for drumming in Building 25 and all warehouses and shops will be handled under the SPCC regulations as appropriate.

The detailed field inventory was subsequently completed. Sixteen specific containment project elements were identified to be included as part of the Phase I - Plant Containment Measures Program. In an effort to be proactive, FLEXSYS prioritized six of these individual containment projects which could be initiated during this construction season. As a result, the following six containment measures are currently being implemented by FLEXSYS as part of Phase IA.

1. Provide full containment for the Sodium MBT Storage Tanks numbered 48-0575 and 58-0578 and a sump for discharge to the existing sewer system. This sump discharge will be connected to Lift Station 1-A once installation is complete.

2. Provide full containment for the Peroxide Storage Tank.

3. Provide additional containment at the Santocure Facility
   - Install additional curbing and drains to contain solids associated with product clean-outs and changeovers.
   - Reroute area drains and roadboxes to direct flow that could potentially go to the segregated stormwater sewer back into the existing plant sewer system.

4. The following pumps will be provided with a curbed concrete containment.
   - Para-phenetidine unloading
   - Sodium MBT Unloading
   - Sodium MBT Circulating and Transfer Pump.

5. Provide a curbed concrete containment around the B-48 Therminol Pump.

6. Provide a curbed concrete containment around the B-48 knock-out pot.

Consistent with the above project premises, the remaining ten specific containment project elements were identified to be included in the Phase IB - Plant Containment Measures Program which will be initiated immediately upon approval of this Plan. These ten project elements are presented below.

Toluene Tanks and Pumps

- Provide curbs for Toluene Transfer Pumps
- Seal existing drains at transfer pump pad
- Enhance containment in Toluene Tank
- Construct concrete pad and curb at Toluene unloading spot
- Provide sump with pump to discharge to the new sewer

Hydrogen Sulfide Gas Holder

- Curb around with drive over ramp for Seal Oil Pot

Install double truck unloading spots south of the Methanol Column and adjacent to the Isopar/Butyraldehyde containment area with new concrete roadway to main road. Provide unloading docks and curbed pump area with sump and pump. Pump discharge will be piped to the existing sewer system to allow drainage of non-affected stormwater. Procedures to evacuate affected stormwater and/or process water will be followed in accordance with existing facility Standard Operating Procedures and the SPCC Plan. The following truck unloading stations to be relocated to this location.

- Isopar
- Methanol
- Butyraldehyde
- Ethyl Hexyl Acrylate
- Ethyl Acrylate
- Hydrochloric Acid
- Tertiary-Butyl-Meta-Cresol (TBMC)
- Isoamylene Methyl Butene (Mixed Isomers)

Install a single truck unloading spot same as above, east of the Tank Farm at Building 91. Transfer the following truck unloading stations:

- Exxol D-3135
- Kwik-Dry
- Morpholine
- Xylene
- Methanol

The following rail car unloading spots shall be provided with spill pans and sumps with pump. Air lines will be installed to the proposed pump. Pump discharge will be piped to the existing sewer system to allow drainage of non-affected stormwater. Procedures to evacuate affected stormwater and/or process water will be followed in accordance with existing facility Standard Operating Procedures and the SPCC Plan. Best engineering practice will be utilized to minimize the number of sumps and pumps installed.

- Aniline
- TBA (tertiary Butyl-Amine)
- Sodium MBT (Sodium-2-Mercapto Benzothiazole)
- Para-Phenetidine
- Acetone
- Hydrochloric Acid

Construct truck unloading pad with curb at the following locations:

- Building 41 50% MBT
- Temporary Truck Caustic

The following pumps shall be provided with curb. Individual sumps and sump pumps will be provided for connections to the new process sewer system. Best engineering practice will be utilized to minimize the number of sumps required.

- TBA unloading
- 50% caustic unloading
- Cyclohexyl Amine unloading
- Cyclohexyl Amine transfer
- Toluene Sulfonic Acid
- Temporary TBA truck unloading

Improvements to the existing tank containment will be provided in the following areas:

- Additional containment at the Toluene Sulfonic Acid tank.

- Improvements to the Methanol tank containment to fully contain tank and to include the Isopar transfer pump. A sump pump with discharge to the new sewer system will be included.
- Install new concrete floor in the Aniline tank containment.
- Carbon Disulfide dike containment pump discharge will be piped to Lift Station 1A.

Containment for the diesel fuel tank will be constructed at the existing WTP.

The following miscellaneous improvements will be considered in the project:

- Install shutoff valve at Santoquin tank farm trench drain.
- Provide curbing and drain of the Building 34 Therminol furnace area.
- The temporary Santoquin drum unloading area will be provided with containment if use will continue.
- Containment will be provided at Laboratory Storage Area.

4.2.2 Phase II - Specialty Products Collection and Segregation

The Phase II portion of the sewer project targets the three individual Building 91 processes which are termed Specialty Products. The Phase II project primarily includes the collection and segregation of all process waste streams from each of the three processes as described below.

Building 91

Pretreatment measures in Building 91 will consist of suspended solids removal and non-aqueous separation in two stages. The collection and segregation system will be accomplished through a renovated trench and floor drain system. Drains from vessels and other processing points will be routed to the renovated trench system and flow to a new sump. The sump will function as a gravity separator. Provisions will be made in the sump design to facilitate the installation of future air control devices. The effluent from the sump will flow through an API oil separator and then into the new underground dual-contained process sewer constructed inside a 30-inch steel casing pipe. The area on the east side of the building which lies north of the control room will be built up with an 8- to 12-inch concrete slab and the process discharges from this area will be routed to the new trench system sump.

Source control measures will be tailored to each area of the building. The SP-3 area will be curbed and the minimal wash water from this area will be collected in a sump and pumped to the new trench system sump. The SP-3 drumming area will be curbed and absorbent material will be used to control the spillage. The SP-3 rework drum unloading area will be curbed and absorbent material will be used to control the spillage. The recirculating and packout filters in the SP-3 area will be raised, curbed and absorbent material will be used to control the drainage from these filters. The filter wash station will be modified to contain the wash water from the filter washes. A screen will be used to collect the gels washed from the filters and the wash water will be allowed to flow into a sump which will be transported to the SP-3 sump for pumping to the new trench system sump. After these changes in the SP-3 area, floor washing frequency and duration should be reduced. The wash water from this operation will be collected in the SP-3 sump and pumped into the new trench system.

There are three areas on the roof of Building 91 which will be curbed. The collected suspended solids generated from wash and stormwater will be directed into a 20,000-gallon aboveground surge tank which will discharge into the new trench system sump. This surge tank will be baffled and will contain multi-level "oil" removal and solids removal. All other roof drainage from Building 91 will be discharged into the new process sewer. The 5,400-gallon dirty acid discharge to the sewer will be discontinued. Instead, 360 gallons of hot acid will be discharged once per shift into a 500-gallon surge tank which will be emptied at 1 gallon per minute into the new trench system sump. Upon completion of the above-referenced new sewer project elements, the existing sewer lines will be closed-in-place.

4.2.3 Phase III - Main Process Sewer Backbone

In order to properly evaluate the optimum means of routing and connecting new process sewers from the individual plant process building units (Building Nos. 34, 41, 47, 48 and 91) to the existing wastewater treatment plant, an evaluation was made of various construction techniques. These construction techniques considered installation of gravity sewers (conventional underground, pipe in concrete trenches, and micro-tunneling), pumped systems (to Lift Station 1A or equalization tanks) and an aboveground gravity sewer or force main (from equalization basin and storm tanks to wastewater treatment plant).

Micro-tunneling involves drilling a borehole at a specified angle (close to horizontal but slightly sloped) while advancing a carrier pipe to support the borehole walls. The new sewer pipe is then inserted into the carrier pipe. An excavation is required at each end of the proposed sewer pipe to properly stage, launch, and retrieve the micro-tunneling equipment. Micro-tunneling was selected as the appropriate excavation technique in most areas as it generates lower volumes of excess soil and more easily avoids existing utilities than conventional excavation.

The specified construction materials are based on current selections which satisfy the design requirements. As the project evolves during the implementation phase, FLEXSYS will take advantage of any new information or data which may provide opportunities to enhance the existing design and/or materials of construction. Based upon these evaluations, the following six project elements were developed along with optimum construction techniques and routings.

1. An east-west gravity main trunk sewer (16" double wall HDPE in 30" casing) will be installed through the technique of micro-tunneling from a point approximately near the southwest corner of Building 91 to the intersection of B Street and Nutrition Avenue. A new lift station, LS-1A, will be installed at this location. All of the individual plant process building unit sewers will be discharged into this main trunk sewer. This trunk sewer will be installed in B Street and will have access points for maintenance at strategic locations. These strategic locations will be mainly at the intersection points of various other sewers. The estimated invert depth of the new main trunk sewer is 8 feet bls at Building 91 and approximately 18 feet bls at LS-14.

2. Process wastewaters from Buildings 34 and 41 will discharge to a new process sewer line in 5th Street. This sewer will be micro-tunneled (6" double wall HDPE in 30" casing) from a point south of Building 34 and will flow via gravity northward to the main trunk sewer. Buildings 34 and 41 will connect to this micro-tunneled gravity sewer as required. The estimated minimum invert depth of this new process sewer line will be 4 feet bls and it will slope downward as appropriate to intersect the new main trunk sewer in B Street.

3. Process wastewaters from Building 91 will be discharge via a new process sewer line running along the west side. Approximately at the two-thirds point, from south to north, there will a pretreatment unit (see Section 4.2.3). The sewers will be micro-tunneled (12" double wall HDPE in 30" casing). These sewers will flow southward to the main trunk sewer in B Street. The estimated minimum invert depth of this new process sewer line will be 4 feet bls and it will slope downward as appropriate to intersect the new main trunk sewer in B Street.

4. Process wastewaters from Building 47 will be directed to new process sewers on the east and west side. The sewer on the west side of Building 47 will have a cooling apparatus to reduce the temperature. These sewers will then travel southward to the common trunk

sewer. All of the sewers (12" double wall HDPE) for Building 47 will be constructed in a concrete trench. A pretreatment unit will be located on the east side (see Section 4.2.2). The east sewer will be combined with Building 48 sewer and will be discharged to the common trunk sewer in B Street. This sewer line will also be completed in a concrete trench. The estimated minimum invert depth of this new process sewer line will be 4 feet bls and it will slope downward as appropriate to intersect the new main trunk sewer in B Street.

5. As stated before, the sewers will flow to a point near the intersection of B Street and Nutrition Avenue where there will be a new main pump station, LS-1A. This station will have a pumping apparatus, emergency generation, solids separation, oil separation, and an air treatment system. From this point, the process wastewaters will be pumped via a new line to the outlet of existing Lift Station 1, which flows to Equalization Tanks 1 and 2 (southern 2 tanks). This new 24" double-wall contained HDPE line will be constructed on concrete cradles on top of the ground surface, and backfilled for thermal protection.

6. Lift Station 1 will remain intact. A new line will be constructed from the existing standpipe directly to the WTP. This line will be a 24" double-wall contained HDPE line laid on concrete cradles on top of the ground surface. The line will then be backfilled for thermal protection. The line will bypass existing Lift Station 2 and will connect to the entrance of the existing Aeration Basin. A second new pumping station, LS-1B, will be provided at the outlet of the storm tanks. Pumping apparatus will be necessary to drain the storm tanks under normal operation and to drain the equalization tanks in the event that it should become necessary for maintenance. Once this new line is operational, the existing sewer line from the Equalization Tanks to the WTP will be closed-in-place.

In addition to the completion of the main sewer backbone, Phase III projects will include final connections to the principal process unit Buildings as described below.

Building 34

Source control measures in Building 34 will primarily consist of rerouting the process wastewater into new process sewers. Extensive curbing will be installed to contain potentially-impacted stormwater and direct it to new process sewers. The existing underground process sewers will be closed-in-place and replaced with exposed piping or sewers contained in a shallow concrete trench. The existing solids wash-down trenches will be repaired and renovated. Wastewater from this building will be discharged directly without pretreatment into a new underground process sewer. All roof drainage from this building will be directed into the existing sewer and conveyed to the existing WTP.

Building 41

Source control measures in Building 41 will primarily consist of rerouting the process wastewater into new process sewers. The floor in the Sodium MBT filtering area will be raised approximately twelve inches and a new solids wash-down trench will be installed. The area between the production building and the Building 41 control room will be raised approximately twelve inches and new process sewer will be installed in a shallow concrete trench. Extensive curbing will be installed to contain potentially-impacted stormwater and direct it to new process sewers. The existing underground process sewers will be closed-in-place and replaced with exposed piping or sewers contained in a shallow concrete trench. The existing solids wash-down trenches will be repaired and renovated. Wastewater from this building will be transmitted to the new process sewer. The emergency vent seal pot, which currently discharges to the process sewer, will be raised so that this discharge may be drummed instead of being discharged into the sewer.

Building 47

Source control and pretreatment measures in Building 47 will consist of suspended solids removal from wash-down water and potentially-impacted stormwater flows. The column "bottoms" will be cooled with a non-contact heat exchanger to reduce the high temperature. Extensive curbing will be installed to contain potentially-impacted stormwater and direct it to a new process sewer. Roof drainage will continue to be directed to the existing sewer system for treatment at the WTP. The existing underground process sewers will be closed-in-place and replaced with exposed piping or sewers contained in a shallow concrete trench. The existing solids wash-down trenches will be repaired and renovated. The removal of suspended solids from the wash-down trench and stormwater flows will be accomplished by a gravity type-separator. This separator will be baffled and will remove both "oil" and solids. This separator will be shared with Building 48.

Building 48

Pretreatment measures in Building 48 will consist of suspended solids removal from the solids wash-down trench system which includes the crude liquid filter clean-out wash water. The existing underground process sewers will be closed-in-place and replaced with exposed piping or sewers contained in a shallow concrete trench. The removal of suspended solids from the wash-

down trench will be accomplished by a gravity-type separator for gravity separation. This separator will be shared with Building 47. Flow to the Building 47 solids separator will be by gravity or pumped depending on the depth of the new main process sewer.

Source control measures will include control of the wash water from the crude liquor filter which is currently cleaned out every two to three days. When the crude liquor filter canister is opened, the accumulated solids along with the filter precoat are broken loose from the crude liquor filter elements and directed (via a curb inlet) to the existing sewer where it is conveyed to the WTP. This area will be curbed such that all of the wash water enters the existing solids trench system which in turn will be directed to the Building 47/48 solids separator. Extensive curbing will be installed to contain potentially-impacted stormwater and direct it to new process sewers. All roof drainage from this building will be directed into the existing sewer and treated at the WTP.

4.3 Proposed Implementation Phases and Schedule

There are a number of variables that are critical to the development of the proposed implementation schedule including:

- Prioritization of projects which are readily implementable and result in immediate environmental benefit;
- Prioritization of large-scale project elements on the basis of maximizing long-term environmental improvements; and
- Completion of the Sewer Stabilization Measures Program by November 2004 as previously agreed upon with the USEPA;
- Consideration of optimum construction periods which take advantage of weather and planned unit outages associated with normal plant operations and maintenance activities;
- Consideration of remaining engineering/design requirements as well as logistical construction sequencing requirements.

After evaluation of these variables, FLEXSYS has developed the overall project implementation schedule which is presented as Figure 2. As indicated on Figure 2, the schedule is broken down for each of the primary project elements. The actual implementation of Phases IA, IB and II are each scheduled to be completed in single construction seasons. Phase III has numerous project elements and will require three construction seasons to complete implementation.

It should be noted that the facility has voluntarily accelerated the overall implementation schedule in two areas. First, the facility has already initiated Phase IA activities and the work is being completed concurrent with the submittal of this Plan. Second, the proposed scheduled completion for all Sewer Stabilization Measures is December 2002, which is two years prior to the agreed upon milestone in the original work plan. FLEXSYS is committed to maintaining this accelerated schedule. The final two construction sessions (2003 and 2004) will only be required in the event of unforeseen and uncontrollable construction related delays.

5.0 PROJECT MANAGEMENT PLAN

This section outlines the Project Management Plan (PMP) and includes the technical approach, schedule, and qualifications and responsibilities of the key personnel for implementing the Sewer Stabilization Program for the Nitro Facility Sewer System SWMU. An organization chart is presented as Figure 3.

The specific program elements outlined in this PMP include implementation of the sewer stabilization measures; management of soil generated during construction activities; field screening, sampling and analysis of the soil for characterization and disposal purposes; quality control/quality assurance measures; and health and safety measures. The implementation of these supporting program elements is described in Sections 6.0 through 9.0. Any significant deviation from procedures outlined in this PMP will be submitted for review and approval prior to implementation.

5.1 Technical Approach

The Sewer Stabilization Measures Plan outlined in this document have been developed following the specifications and requirements of the facility Corrective Action Permit. The principal process related waste streams will be segregated for conveyance to the existing facility WTP through a newly installed process sewer system, thus significantly reducing the potential for release to the environment. Construction of the new sewer lines and associated lift stations, wash-down trenches and pretreatment units will result in the excavation of several thousand yards of soils. Soils generated during construction activities will be characterized to ensure proper handling, staging, and disposal of potentially hazardous soil. Soils that are designated for reuse as fill material will be staged separately in the facility. The Soil Management Plan and Water Waste Management Plan are presented in Sections 6.0 and 7.0, respectively. The Quality Assurance Project Plan and Health and Safety Plan targeted to soil and water waste handling, characterization and disposal activities are provided in Section 8.0 and 9.0, respectively.

5.2 Schedule

As previously described, the overall Sewer Stabilization Program is a comprehensive initiative which will require six years for implementation. Currently, it is scheduled to be completed by the end of the year 2002. Due to the inherent complexities of implementing a project of this scale at an

active facility, the actual schedule may be subject to changes. However, FLEXSYS is committed to implementing the project per the schedule shown on Figure 2. The USEPA will be notified of any significant deviations to this schedule via direct communications.

5.3 Project Team

FLEXSYS has retained a multi-discipline project team to implement the Sewer Stabilization Measures Program. Key members of the project team are listed below. A project organization chart is presented as Figure 3. Due to the complexity of the projects, and the multiple phases of implementation, the list of selected contractors and individual personnel will be subject to change. FLEXSYS will provide the USEPA with a revised Figure 3 (in advance of each field implementation period) for their review and approval.

The Health and Safety (H&S) Environmental Project Manager bears the primary responsibility for the successful completion of the work in accordance with the Sewer Stabilization Work Plan. This Project Manager will be determined at a future time. This individual provides the overall management for execution of the site work in regards to the RCRA issues and will support the activities of the Field Sampling Team, Laboratory Manager, and the Disposal Coordinator. Responsibilities include coordination of all field support activities, data review, oversight of soil profiling and disposal, and report preparation. The Project Manager reports to the Monsanto Project Manager who will serve as the generator of any soil wastes generated during this project. The analytical laboratory service and soil disposal facilities have yet to be determined.

The selected construction contractor project manager (Construction Manager) is yet to be determined. This individual will be responsible for coordination of all construction activities with the designated FLEXSYS and Monsanto Project Managers. Responsibilities include procurement of labor, materials, and equipment necessary to complete all construction-related tasks, and coordination of subcontractors (i.e. mechanical, electrical, and process control vendors, etc.) to complete site tasks in a timely manner. The Construction Superintendent will oversee all day to day construction-related activities and will coordinate all activities with and report to the Construction Manager. The construction contractor will also designate a Construction Site Health and Safety Officer (CSHSO). This individual is responsible for the construction contractors health and safety issues and reports to the Construction Manager.

The Design Engineer (Smith, Seckman, and Reid) will be responsible for supporting the field implementation of the sewer project. This individual coordinates all activities with the Construction Manager and oversees the contractor responsible for providing process engineering design and the waste treatability studies and implementation (The Advent Group).

Monsanto and FLEXSYS will designate a Field Team Leader who will be responsible for the successful execution of the field support program. This individual directs the activities of technical staff in the field and assists in the interpretation of data and report preparation. Responsibilities include the management of technical staff and oversight of subcontractors. In addition, the Field Team Leader may be designated as the Site Health and Safety Officer (SHSO), responsible for the implementation of the Health and Safety Plan (HASP). The Field Team Leader reports to the H&S/Environmental Project Manager.

The Laboratory Manager is responsible for sample container preparation, sample custody in the laboratory, and completion of the required analyses through oversight of the laboratory staff. The Laboratory Manager will ensure that quality assurance procedures are followed and that an acceptable laboratory report is prepared and submitted. The Laboratory Manager reports to the H&S/Environmental Project Manager.

The Disposal Coordinator will support the team by working with the H&S/Environmental Project Manager to properly characterize and profile soils requiring off-site disposal. This individual is also responsible for notifying the H&S/Environmental Project Manager when a problem arises with any disposal matters or when soil is approved for disposal. This individual will also help with manifesting matters and will coordinate transportation.

The key contacts for the facility and regulatory agencies responsible for overseeing the Sewer Stabilization Measures and contracted services are listed below:

Facility Contact: Ms. Christine Weber
or ES&H Manager
FLEXSYS
No. 1 Monsanto Road
Nitro, West Virginia 25143

6.0 SOIL MANAGEMENT PLAN

This section outlines the Soil Management Plan (SMP) that will be followed for the proper characterization, segregation, and handling of soil generated from the Sewer Stabilization Project. Installation of the new process sewer will be accomplished using conventional and micro-tunneling methods to minimize excavation requirements and soil disposal volumes. Previous subsurface investigations at the facility have indicated three categories of soil that are expected to be encountered during construction activities:

- Soil contained within restricted areas that will be classified based on historical data and generator knowledge.
- Soil potentially impacted by previous releases from the Process Sewer SWMU.
- Native soil believed to be non-impacted and acceptable for reuse.

6.1 Pre-Excavation Activities

During this phase of activity, proper planning will be the key element. This phase will include marking areas to be excavated that lie within the designated restricted areas, determining and preparing the soil staging areas, and communicating the Soil Management Plan to the construction contractor personnel. Other pre-excavation activities include procurement of proper soil staging and handling equipment for the expected soil types and volumes.

The determination and preparation of the staging areas for each soil type will be completed in a timely manner in order not to cause delays. Each staging area will be prepared with plastic sheeting to place the soil on, and appropriate soil erosion and sediment controls will be installed. Plastic sheeting or an impermeable synthetic tarp will be used to cover the stockpiles and provide primary erosion control. Additional soil erosion and sediment controls will consist of hay bales, filter fabric/silt fences, or other types of devices. These devices will be installed and maintained downslope of all stockpiles as necessary to ensure that potentially-impacted runoff is controlled.

Communicating the Soil Management Plan to the contractor is extremely important. Site activities will continue most efficiently and construction delays will be minimized if the plan is communicated and implemented properly.

6.2 Excavation Activities

Once site work has started, the Field Team Leader will be responsible for the segregation and proper staging of the generated soil. The Soil Management Plan for the three soil types are discussed below.

6.2.1 Restricted Areas

The facility has developed a significant amount of soil analytical data through various investigative initiatives over its history. This information has resulted in the facility designating several restricted areas. For these restricted areas, the facility and the USEPA agreed to implement engineering controls consisting of clay and/or gravel covers as a means to mitigate potential exposure via direct contact. These presently covered areas are maintained by the facility and intrusive activities are restricted. If intrusive activities are necessary, as is the case in this sewer project, the facility relies on the historical data and generator knowledge to classify excess soils generated as described below.

For activities within these designated restricted areas, the Soil Management Plan is simple, but critical. Once the expected surface excavation area is marked off, an estimate of the restricted soil volume must be established so that the proper number of roll-off boxes can be delivered to the site. When excavating in these areas, the soil from the surface to three (3) feet below ground surface (bgs) will be segregated based on existing site data and generator knowledge. Excess soils generated from the zero to three-foot interval within these restricted areas will immediately be placed in roll-off boxes. These roll-off boxes, once filled, will be covered with tarps, clearly labeled with the contents, and placed in the designated staging area awaiting proper disposal. Once the three (3)-foot interval is reached and all of the restricted area soil is properly stored, any excavation equipment which came in contact with these materials will be decontaminated. The decontamination water or other runoff will be drummed for proper disposal as discussed in Section 7.0.

Once outside of the designated restricted area boundaries or below the three-foot interval, excess soils generated will be field classified utilizing a combination of excavation location and field screening results as described in Sections 6.2.2 and 6.2.3.

6.2.2 Soils From the Process Sewer SWMU

These soils will be field classified based on excavation location and field screening results. Any soil to be removed from within twenty (20) feet of a sewer line that is associated with the existing Process Sewer SWMU will be field classified as potentially-impacted SWMU soil and will be sampled for characterization purposes. The twenty-foot interval is selected based on a conservative estimate of soil volumes which could potentially be impacted from a historic sewer line release and the ability to accurately field segregate soils generated from micro-tunneling procedures. Once the analytical results are received for this soil, it may be recharacterized as soil that is acceptable for reuse. Soil outside the 20-foot interval will be treated as native soil as described below.

6.2.3 Native Soil

Any soil that is encountered outside the restricted area or the Process Sewer SWMU will be field screened using a photoionization detector (PID). If field screening indicates a PID reading of over 250 units, that soil will be field classified as SWMU soil and placed in the proper staging area for sampling. Again, the soil may be reclassified once analytical results are received. Soil exhibiting PID readings below 250 units will be field classified as acceptable for reuse.

6.3 Field Screening Program

Field activities will be conducted by personnel trained in sample collection procedures. In addition, each individual will be capable of calibrating any field equipment which may be utilized during site activities. Equipment calibration will be conducted on the morning of use and will be documented in the field logbook. The Field Team Leader will be responsible for all aspects of field screening and sampling activities.

The field screening program will consist of collecting representative samples of the excavated soil and testing the headspace of the soil with a PID meter. Soils that are excavated from the upper three (3) feet of a restricted area will not be field screened.

6.4 Analytical Program

The analytical program will consist of collecting composite samples for laboratory analysis from soil determined to be potentially hazardous based on location (the zero to three-foot interval within a restricted area, or proximate to a SWMU area soil) or field screening results (above 250 units).

One (1) composite sample will be collected from each excavation area determined to be a potential source of hazardous constituents and will be analyzed for waste characterization purposes.

The samples will be analyzed for Toxicity Characteristic Leachate Procedure (TCLP) volatile organics, TCLP semi-volatile organics, and pH using USEPA-approved methods 1311/8240, 1311/8270, and 9045, respectively. All samples will be analyzed for TCLP volatiles, with selected samples analyzed for TCLP semi-volatiles and pH, based on location, field observations and generator knowledge.

All samples will be collected using decontaminated or disposable sampling equipment. The sampler will also change gloves after each sample to prevent possible cross contamination. Soil samples will be collected immediately after field screening. Samples will then be placed in pre-cleaned, laboratory supplied containers that will be provided by the laboratory. After the sample is collected, field personnel will enter the following in the field logbook:

- sampler's name(s);
- time of sampling;
- number of bottles; and
- analyses requested.

Each sample container will be labeled by the field sampler with the sample designation, time and date of collection, and the sampler's initials. The sample containers will be placed on ice in an insulated cooler and preserved to a temperature of approximately 4° Celsius. A chain-of-custody form will be completed and maintained for all samples throughout collection, transport, and delivery. Following collection of all samples, the coolers will be secured with numbered custody seals and shipped via next day delivery carrier service to the laboratory.

7.0 WATER WASTE MANAGEMENT PLAN

This section provides the Water Waste Management Plan (WWMP) that will be implemented for the proper characterization, segregation, and handling of water wastes generated during the Sewer Stabilization Project. The majority of the sewer project will be completed above the water table; therefore, dewatering is not expected to be required. However, water wastes will be generated during the micro-tunneling process as well as miscellaneous support activities and will be managed as described below.

7.1 Water Wastes from Micro-Tunneling

The micro-tunneling technique to be used for a portion of subsurface process sewer line installation uses a slurry system for cuttings removal. See Plate 3 for locations of planned micro-tunneling. It is estimated that approximately 20,000 gallons of potable water will be required. The potable water and the recovered cuttings will be handled in dedicated temporary aboveground storage tanks. The recovered slurry tank will be constructed to maximize settling of solids. If necessary, a flocculent may be added to facilitate solids precipitation.

Once settling is complete, one representative sample of water and one of the solids will be collected from the tank and analyzed for waste classification purposes as described in Section 6.4. Upon completion of waste characterization activities, non-hazardous water will be removed from this tank, filtered as necessary, and discharged to the existing sewer for treatment at the facility WTP. If the water is found to be RCRA hazardous, a separate plan will be developed.

7.2 Miscellaneous Water Wastes

Miscellaneous water wastes will be generated from equipment and/or personnel decontamination activities, and potentially from stormwater runoff, which has contacted the stockpiled soil staging areas.

If the water waste is generated from activities within the designated restricted areas confines, it will be segregated and drummed for off-site disposal. All other miscellaneous water wastes will be containerized and sampled for waste characterization purposes as described in Section 6.4. If analytical data confirms that these water wastes are non-hazardous, this material will be pumped

to the existing WTP for treatment. If any water waste is found to be RCRA hazardous it will be segregated and drummed for off-site disposal.

8.0 QUALITY ASSURANCE PROJECT PLAN

8.1 Introduction

This Quality Assurance Project Plan (QAPP) outlines the measures that will be taken to ensure that the data generated during the Sewer Stabilization Program soil sampling activities are of quality sufficient to meet the data quality objectives of precision, accuracy, and completeness. This QAPP presents the organization, objectives, functional activities, and specific quality assurance (QA) and quality control (QC) activities associated solely with soil sampling and waste characterization activities to be performed during the Sewer Stabilization Measures Program. This QAPP also describes the specific protocols that will be followed for sampling, sample handling and storage, chain-of-custody, and laboratory and field analyses.

The QAPP has been prepared following guidance in the USEPA document titled, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans QAMA-005/80, dated December 29, 1980. The following sections discuss the Quality Assurance/Quality Control (QA/QC) measures which will be implemented during soil management and analytical activities.

The primary objective of the QAPP is to ensure that the soil characterization data obtained accurately reflect actual conditions at the Nitro facility. Deviations from expected conditions will be noted, and appropriate corrective measures will be taken to maintain quality in the sample collection and analysis program.

8.2 Contents

The QAPP has been divided into sixteen subsections and includes the QAPP elements in the above-referenced USEPA guidance document with the exception of a title page. The main title page of this Sewer Stabilization Work Plan satisfies the title page requirements. Sections 8.1 and 8.2 provide an introduction and description of contents. Section 8.3 provides a brief description of the proposed activities. Section 8.4 details the designations and general responsibilities of the project team. A summary of the overall QA objectives for data management is provided in Section 8.5. The respective levels of data quality objectives which this Plan will adhere to are also included in Section 8.5. Sample collection, handling, and document custody procedures are explained in Sections 8.6 and 8.7. Field and laboratory equipment calibrations procedures are detailed in

Section 8.8. Section 8.9 describes laboratory analytical procedures including analytical methodology and the proposed laboratory deliverables package. Data handling and validation along with a description of internal QC checks to be conducted are provided in Sections 8.10 and 8.11, respectively. Sections 8.12 describes the various types of QA auditing which will be conducted. Preventative maintenance procedures to be followed by the technical personnel and the analytical laboratory are provided in Section 8.13. Section 8.14 explains the various assessment procedures which will be followed to access the quality of the laboratory and field data collected. Procedures for correcting analytical and noncompliance problems are explained in Section 8.15. Finally, Section 8.16 discusses those QA reports which will be completed to track the laboratory and field activities during the course of the project.

8.3 Project Description

Soil samples will be collected as part of the Sewer Stabilization. Soil sampling elements of this project are described in detail in Section 6.0. The project schedule, including start and completion times, are described in Section 5.2 and shown in Figure 2.

8.4 Project Organization and Responsibility

The overall management structure and a general summary of the responsibilities of project team members is presented below. An organization chart is provided in Figure 3.

Project Manager

The H&S/Environmental Project Manager bears the primary responsibility for the successful completion of the work in accordance with Sewer Stabilization Work Plan. This individual provides overall management for the execution of the Sewer Stabilization and directs the activities of the Field Team Leader, Laboratory Manager, and Disposal Coordinator. Responsibilities include coordination of all field activities, data review and interpretation, and report preparation. The H&S/Environmental Project Manager reports to Monsanto.

Field Team Leader

The Field Team leader bears the primary responsibility for the successful execution of the field program. This individual directs the activities of technical staff in the field and assists in the interpretation of physical and chemical data, and report preparation. Responsibilities include the

management of technical staff, and oversight of subcontractors such as the driller and laboratory. In addition, the Field Team Leader may be the designated Site Health and Safety Officer (SHSO), responsible for the implementation of the HASP. The Field Team Leader reports to the H&S/Environmental Project Manager.

Laboratory Manager

The Laboratory Manager is responsible for sample container preparation, sample custody in the laboratory, and completion of the required analysis through oversight of the laboratory staff. The Laboratory Manager will ensure that quality assurance procedures are followed and that an acceptable laboratory report is prepared and submitted. The Laboratory Manager reports to the H&S/Environmental Project Manager.

Quality Assurance Manager

The Quality Assurance Manager is responsible for conducting reviews, inspections, and audits to assure that the data collection is conducted in accordance with this Plan. These responsibilities range from effective field equipment decontamination procedures, to proper sample collection, to review of all laboratory analytical data (including tentatively identified compounds, if analyzed) to ensure completeness and usefulness. The Quality Assurance Manager reports to the H&S/Environmental Project Manager.

8.5 Quality Assurance Objectives for Data Measurement

The overall QA objective is to develop and implement procedures for field sampling, laboratory analysis, and reporting that will provide results which maximize the likelihood that the data are collected, analyzed and documented such that it is representative and defensible. Specific procedures for sampling, chain-of-custody completion, instrument calibration, laboratory analysis, data reporting, internal quality control, audits, preventive maintenance of field equipment, and corrective action are described in subsequent sections of this QAPP.

8.5.1 QA Objectives for Laboratory Analytical Data

The fundamental QA objective with respect to accuracy, precision, and sensitivity of laboratory analytical data is to achieve the QC acceptance criteria of the analytical protocols. Accuracy, precision, and completeness requirements will be addressed for all the data generated. Accuracy,

the ability to obtain a true value, is monitored through the use of field and method blanks, spikes, and standards, and compared to federal and state regulations and guidelines. This will reflect the impact of matrix interferences. Precision, the ability to replicate a value, is monitored through duplicate (replicate) samples. It is assessed for each matrix. Corrective actions and documentation for substandard recoveries, or substandard precision, will be performed by the laboratory. Instrument sensitivity is performed through the analysis of reagent blanks, near detection limit standards, and response factors.

8.5.2 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of the data required to support decisions made as part of the Sewer Stabilization and are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality. There are five analytical levels which address various data uses and the QA/QC effort and methods required to achieve the desired level of quality. The levels are described in reference to USEPA's Contract Laboratory Program (CLP). These levels are listed below.

- Field Screening - (DQO Level I): This level provides the lowest data quality but the most rapid results. It is often used for health and safety monitoring at sites, initial site characterization to locate areas for subsequent analyses, and for engineering screening of alternatives (bench-scale tests). These types of data include those generated on the Site through the use of pH and conductivity meters, and other real-time monitoring equipment used in the field (such as PID meters).

- Field/Non-Chemical Laboratory Analyses - (DQO Level II): This level provides rapid results and better quality than in Level I. This level may include mobile lab/portable gas chromatography generated data depending on the level of quality control exercised (e.g., soil gas survey), or off-site laboratory analyses requiring less stringent quality control criteria (e.g., geotechnical analyses).

- Engineering - (DQO Level III): This level provides in intermediate level of data quality and is used for site characterization. Engineering analyses may include mobile lab generated data and analytical lab methods (e.g., laboratory data used for delineation but without Full CLP quality control documentation).

- Confirmation - (DQO Level IV): This level provides the highest level of data quality and is used for purposes of risk assessment, evaluation of remedial alternatives, and potentially responsible party (PRP) determination. These analyses require full CLP analytical documentation, and data validation procedures in accordance with USEPA protocol.

- Non-Standard - (DQO Level V) This level refers to analyses by non-standard protocols, for example, when exacting detection limits or analysis of an unusual chemical compound is required. These analyses often require method development or adaptation. The level of quality control is usually similar to DQO Level IV data.

Field measurements (e.g., water-level measurements, pH, conductivity, temperature, or air monitoring) will be conducted at DQO Level I. Soil, decontamination water and ground-water (if any) sampling and analysis will be conducted at DQO Level III.

8.6 Sample Collection Procedures

Field activities will be conducted and recorded by personnel fully trained in sample collection procedures as outlined in Section 8.0 of the RFI Work Plan which was previously approved by the USEPA. Sample chain-of-custody forms will be prepared for field tracking documents.

8.7 Sample Custody and Documentation Procedures

The possession and proper transfer of containers, samples and sample-related information must be traceable from the time the containers are prepared in the laboratory, until the samples have been accepted for analysis, and after the samples have been analyzed and placed back in storage. The following sections summarize the general aspects of custody and how they will be applied and managed during the course of the project.

A sample or sample-related information (sample or evidence file) is under your custody if they:

- are in your possession;
- are in your view, after being in your possession;
- are in your possession and you place them in a secured location; or
- are in a secured, designated place.

8.7.1 Field Chain-of-Custody Procedures

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

(a) The Field Team Leader is responsible for the care and custody of the samples until they are transferred or properly dispatched. As few people as possible will handle the samples.

(b) All bottles will be labeled with the appropriate sample numbers and locations.

(c) Sample labels are to be completed for each sampling using waterproof ink unless prohibited by weather conditions.

(d) Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage place.

(e) Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate, signed custody record enclosed in each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory.

(f) All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record and yellow copy will accompany the shipment, and the pink copy will be retained by the sampler for returning to the sampling office.

(g) If the samples are sent by common carrier, a bill of lading (airbill) must be used. Receipts of bills of lading will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside of the sample cooler and the custody seals remain intact.

8.7.2 Laboratory Chain-of-Custody Procedures

Laboratory custody procedures for sample receiving and log-in, sample storage, tracking during sample preparation and analysis, and storage of data will be followed.

The Laboratory will ensure that chain-of-custody records are filled out upon receipt of the samples and will note questions or observations concerning sample integrity. The Laboratory will also ensure that sample-tracking records are maintained. The records will follow each sample through all stages of laboratory processing. The sample tracking records must show the date of sample extraction or preparation and the date of instrument analysis. These records will be used, in part, to determine compliance with holding time requirements.

8.7.3 Field Logbooks/Documentation

Field logbooks will be used to document data collecting activities performed in the field. As such, entries will be described in sufficient detail such that persons going to the site can reconstruct a particular situation without reliance or memory. A summary of field documentation requirements is presented below.

Field sampling logbooks will be bound field survey books or notebooks. Logbooks will be assigned to field personnel, but will be stored in a secure location when not in use. Each logbook will be identified by the project-specific document number.

The title page of each logbook will contain the following:

- logbook number;
- project name;
- project start date; and
- end date.

At the beginning of each day's entry, the date, start time, weather, objective of the activity, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered into the field sampling logbook. The names of visitors to the site, field sampling or investigation team personnel, and the purpose of their visit will also be recorded in the field sampling logbook.

Any measurements made and the designations of samples collected will be recorded. Entries will be made in ink (if possible) and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark and initialed by the person making the correction. Whenever a sample is collected, or a measurement is made, a detailed description of the location of the station shall be recorded. The number of the photographs taken of the area, if any, will also be noted. Equipment used to obtain measurements will be identified, along with the respective records of calibration.

The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, sample volume, and number of containers. Sample identification numbers will be assigned prior to sample collection. Field duplicate samples, which will receive a separate sample identification number, will be noted under sample description (in the field logs, but not the chain-of-custody).

8.7.4 Sample Collection Bottles and Holding Times

Sample collection bottles will be supplied by the laboratory and coordinated to arrive at the site one day before the sampling day and no greater than two days following trip blank preparation by the laboratory. Sample bottles will be kept under constant chain-of-custody at all times. Sample collection bottles will be inspected by field personnel to ensure they were precleaned. Any containers with loose or missing caps will not be used. Extra containers will be included in the bottle order to replace any containers broken during shipment and/or to obtain additional samples if desired based on observations during sampling activities. QC sample containers, along with a supply of deionized, analyte-free water, will be obtained from the laboratory. Trip blanks will be prepared with laboratory-grade water at the sample container origin and will accompany the sample containers to the site and back to the laboratory for analysis.

No preservatives are required for the soil samples, except to cool and maintain with ice to approximately 4° Celsius. This will be accomplished by placing the sample containers in a cooler with ice immediately after the sample is collected. Any preservatives needed for the aqueous samples will be added at the laboratory prior to shipment. No preservatives will be added to the samples in the field. For each shipment of sample containers, the pH will be checked to ensure that the preservative is sufficient. The field team will be prepared to add preservative if it is found to be insufficient.

The samples will be shipped/transported at the end of each sampling day to the laboratory. The laboratory will perform each required analysis and/or extraction before the method holding time has expired.

9.0 HEALTH AND SAFETY PLAN

This site-specific Health and Safety Plan (HASP) has been prepared in accordance with 29 CFR 1920.120. It addresses activities associated solely with the sewer project soil sampling and characterization to be performed at the FLEXSYS, Nitro, West Virginia facility. This HASP is preliminary only and is not intended for use by Contractors. Other contractors and subcontractors, when identified, will be responsible for providing Health and Safety Plans specific to the scope of work and equipment to be used for the sewer project construction-related activities.

Compliance with this HASP when finalized by the selected H&S/Environmental Contractor is required for subcontractor personnel who enter the work area during performance of soil sampling, characterization and disposal activities. The content of this HASP may undergo revision based upon additional information made available. Any changes proposed must be reviewed and approved by the H&S/Environmental Contractor OHSM or his/her designee.

In addition, FLEXSYS's "Plant Rules for Contractor" contains safety requirements and emergency response procedures. These rules must be followed by all personnel. This document is contained in the original RFI Work Plan, which was submitted by Monsanto and Roux Associates, Inc. on April 8, 1994, and subsequently approved by the USEPA.

9.1 Health and Safety Personnel Designations

Office Health and Safety Manager (OHSM)

The OHSM serves to assure that the policies and procedures of the HASP are implemented by the SHSO. The OHSM is responsible for providing the appropriate monitoring and safety equipment and other resources necessary to implement the HASP. The OHSM ensures that personnel designated to work on site are qualified according to applicable USEPA, Occupational Safety and Health Administration (OSHA), and state requirements.

Site Health and Safety Officer (SHSO)

The SHSO will be on site during field operations. The SHSO is responsible for health and safety activities and has the authority to make related decisions. In the event field conditions warrant

modification to the HASP, a Field Change Request will be completed. The determination of hazard levels will be made by the SHSO. The SHSO has stop-work authorization which he or she will execute upon determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. Authorization to proceed with work will be issued by the OHSM in consultation with the H&S/Environmental Project Manager. Assistant SHSOs may be designated, if required, but must be pre-qualified and approved by the OHSM.

Field Team Leader (FTL)

The FTL bears the primary responsibility for the successful execution of the field program. This individual directs the activities of technical staff in the field and assists in the interpretation of physical and chemical data, and report preparation. Responsibilities include the management of technical staff, and oversight of contractors such as the construction contractor and laboratory. In addition, the Field Team Leader will be the designated SHSO, and is responsible for the implementation of the HASP. The FTL reports to the H&S/Environmental Project Manager.

9.2 Proposed Scope of Work

The HASP will regulate activities associated with the following tasks:

Oversight of contractors performing the following:

- Installation of temporary soil handling and staging areas for excess soil wastes generated during installation of the new sewer line and appurtenances.

Completion of the following activities:

- Soil screening/sampling during excavation work.

9.3 Hazard Assessment

- *Chemical Hazards*
  Possible historical releases of hazardous materials to soil, including VOCs, semivolatile organic compounds, metals and 2,8,5-trichlorophenoxyacetic acid.

- *Ambient Air Hazards*
  Normal plant exposure; plant is anticipated to be operating during the proposed activities. Residual chemicals in soil may volatilize upon exposure to the atmosphere during planned activities.

- *Heat/Cold Stress*
  Construction activities may take place at any time of year. Therefore, a wide range of temperatures can be expected.

- *Noise*
  Normal plant operation.

- *General Safety Hazards*
  Existing Plant Safety Procedures will be followed. Low clearance, slip, trip, and fall hazards. Process/feed lines at work locations; may be hot (>150°F). Flammable materials may be present in work areas. Confined spaces may be created during excavation work.

- *Other*
  Electrical hazards associated with electrical equipment (generators, pumps, etc.).

9.4 Training Requirements

9.4.1 Basic Training

Site personnel who will perform work in areas where the potential exists for toxic exposure will be health and safety trained prior to performing work on site per 29 CFR 1910.120(e). Training records will be maintained by the SHSO and OHSM.

9.4.2 Site-Specific Training

Training will be provided by the SHSO and Field Team Leader (FTL) that will specifically address the activities, procedures, monitoring, and equipment for the site operations to site personnel and visitors. The training will include site and facility layout, hazards, emergency services at the site, and will detail provisions contained within this HASP. Evacuation routes will be communicated to all personnel before work begins. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity. Site-specific training will be documented as part of the project records.

In addition, safety orientation conducted by FLEXSYS is required for all personnel. This orientation includes the review of the procedures manual contained in the RFI Work Plan and the successful completion of a test to verify understanding of plant safety procedures.

9.4.3 Safety Briefings

Project personnel will be given briefings when new operations are to be conducted, changes in work practices must be implemented due to new information made available, and before work is begun at each project site. Records of safety briefings will be part of the project records.

9.4.4 Record Keeping Requirements

Record keeping requirements mandated by 29 CFR 1910.120 will be followed. Specifically, all personnel training records, injury/incident reports, medical examination records and exposure monitoring records will be maintained by the Contractor for a period of at least 30 years after the employment termination date of each employee. The SHSO will maintain a daily written log of health and safety monitoring activities, and monitoring results will become part of the project records.

9.5 Zones of Protection

A three-zone approach is typically employed for site operations when greater than Level D personal protection is required to control the potential spread of contamination. The zones are:

- Exclusion Zone
- Contaminant Reduction Zone
- Support Zone

9.5.1 Exclusion Zone

The Exclusion Zone will include the work area and will provide for full personnel and portable equipment decontamination. No personnel are allowed in the Exclusion Zone without:

- a buddy;
- the proper personal protective equipment;

- medical authorization; and
- training certification.

For purposes of this project, the Exclusion Zone will include the 25-foot radius perimeter surrounding the work areas. The Exclusion Zone will include an equipment drop.

9.5.2 Contamination Reduction Zone

The Contamination Reduction Zone (CRZ) is established between the Exclusion Zone and the Support Zone. The CRZ will contain the contamination reduction corridor and will provide for full personnel and portable equipment decontamination. The CRZ is used for general site entry and egress in addition to access for heavy equipment for investigation activities. No personnel are allowed in the CRZ without the proper personal protective equipment. For the purposes of this project, the CRZ will include a 20-foot radius around the Exclusion Zone, not including the Exclusion Zone.

9.5.3 Support Zone

The Support Zone is considered the uncontaminated area and will contain the support facilities. Appropriate sanitary facilities and safety and support equipment will be located in this zone. The majority of site operations will be controlled from this location as well as site access of authorized persons. No potentially contaminated personnel or materials are allowed in this zone except appropriately packaged/decontaminated and labeled samples and drummed wastes.

9.6 Personal Protection

The level of protection to be worn by field personnel will be defined and controlled by the SHSO. Where more than one hazard area is indicated, further definition will be provided by review of site hazards, conditions, and operational requirements and by monitoring at the particular operation being conducted. Protection may be upgraded or downgraded by the SHSO.

The minimum level of protection for all site activities is Level D. If a sustained organic vapor reading of greater than 5 ppm above background (as measured with an organic vapor meter) is observed in the breathing zone, the level of personal protection will be upgraded to Level C. If a sustained organic vapor reading of greater than 25 ppm above background is observed in the

breathing zone, work will be stopped in the area, personnel will be evacuated, and conditions will be reassessed.

Several areas at the site potentially contain very low concentrations of compounds associated with the manufacture of 2,8,5-trichlorophenoxyacetic acid (2,8,5-T). These areas are considered plant restricted areas as discussed in Section 6.2.1. Intrusive activities within these areas will be minimized by design, and plant procedures will be followed in limited instances where intrusive activities are required. The compound 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) is sometimes found as an impurity in 2,8,5-T.

Task	Initial Level of Protection
Installation of Temporary Soil Handling and Staging Areas	Level D
Soil Sampling	Level D

9.6.1 Respiratory Protection and Clothing

The type of respiratory protection and clothing to be worn in each level of protection indicated above includes the following:

Level D - Minimum for All Site Activities
Coveralls (as appropriate), Boots/shoes - chemical resistant with steel toes and shank, Safety glasses, Hard hat, Gloves

Level C
Full face, air purifying respirator complete with combined cartridges for organic vapors and particulates, Coveralls - disposable (Tyvek or Saranex), Hard hat, Gloves - (taped to Tyvek), Boots - steel toe and shank, chemical resistant complete with disposable covers (taped to Tyvek)

Daily respirator inspections will be conducted by the SHSO when operations requiring Level C protection are on-going. The SHSO will provide information regarding proper respirator maintenance and storage.

9.6.2 Safety Equipment

Basic emergency and first-aid equipment will be available at the Support Zone as appropriate. This will include a first-aid kit, emergency eyewash, and other safety-related equipment.

Emergency showers exist around the facility and will be clearly identified. Other safety equipment will be located at the site of specific operations, e.g., excavations, as appropriate.

9.6.3 Communications

- Telephones - located in various offices for communication with emergency support services/facilities.
- Hand Signals - by downrange field teams along with using the buddy system. These signals are important when working with heavy equipment.
- Walkie Talkies - to be carried by field teams, as necessary, for communication across the site.

9.7 Contamination Prevention

One of the most important aspects of decontamination is contamination prevention. Contamination prevention practices will minimize worker exposure and ensure valid sample results by precluding cross-contamination. Procedures for contamination prevention include the following:

1. For Personnel

   Do not walk through areas of obvious or known contamination;

   Do not handle or touch contaminated materials directly;

   Make sure all personal protective equipment (PPE) has no cuts or tears prior to donning;

   Fasten all closures on suits, covering with tape, if necessary;

   Take particular care to protect any skin injuries; and

   Stay upwind of airborne contaminants.

2. When Sampling

   Do not place uncovered equipment directly on ground;

   When required by the SHSO, cover instruments with clear plastic, leaving opening for sampling and exhaust ports; and

   Bag sample containers prior to the placement of sample material.

1. For Heavy Equipment

   Care should be taken to limit the amount of contamination that comes in contact with heavy equipment;

   If contaminated tools are to be placed on non-contaminated equipment for transport to the decontamination pad, plastic should be used to keep the equipment clean; and

   Excavated soils should be contained and kept out of the way of workers.

All personnel and equipment exiting the Exclusion Zone will be thoroughly decontaminated. Safety briefings will explain the decontamination procedures for personnel and portable equipment of the various levels of protection. Heavy equipment will be decontaminated with a steam cleaner. Washings will be collected, handled, and/or drummed as appropriate, for proper waste disposal.

9.8 Air Monitoring

Air monitoring will be performed during intrusive activities by using a calibrated hand-held totalizing PID and a combustible gas indicator (LEL). Air monitoring will be performed downwind of sampling activities at the boundary of the exclusion zone. Wind direction will be noted by the field sampling team. Background measurements will also be collected.

The PID will be calibrated daily according to the manufacturer's instructions prior to use using an isobutylene/air mixture of known concentration. The LEL will be calibrated daily prior to use according to the manufacturer's instructions using a hexane air mixture of known hexane concentration. Air monitoring data will be used to assess the need for upgrading the level of personal protective equipment used according to guidelines set forth in the site Health and Safety Plan. Calibrations will be noted in the field sampling logbook.

Personal breathing zone samples, 8-hour, time-weighted average (TWA) sampling, may be conducted if sustained organic vapor concentrations requiring Level C are present. The personal breathing zone samples will be collected according to NIOSH analytical methods and analyzed by an AIHA-certified laboratory.

9.9 Safety Considerations for Site Operations

Field sampling will be performed under the level of personal protection described in Section 9.6.1. In this section, non-monitoring safety-related procedures are described.

Safety considerations during site walk-throughs precede all other field operations. The field team will maintain line of sight with each other at all times and regularly maintain communications with the Support Zone. Air monitoring will be performed by the walk-through team to alert the Support Zone personnel if a dangerous situation exists. Air monitoring will assist in prescribing levels of protection for future site operations, designating site layout, and identifying hazard areas, if any.

9.9.1 Heavy Equipment Safety

The SHSO will be present on site during all invasive operations, including excavation, and will provide health and safety monitoring to ensure that appropriate levels of protection and safety procedures are followed.

Typical machinery to be found at the site may include fork lifts, trucks, backhoes, micro-tunneling devices and other heavy equipment. The equipment poses a serious hazard if not operated properly or of personnel near machinery cannot be seen by operators.

Construction crews are confronted with all of these heavy equipment hazards. They must be responsible for good housekeeping around equipment because of moving parts. Maintenance is a constant requirement. Overhead and buried utilities require special precautions because of electrical and natural gas hazards. Electrical storms may seek out standing equipment. Hearing loss, while not an immediate danger, is considerable over time. Use hearing protection.

9.9.2 Excavation and Related Operations

The SHSO will be present on site during excavation and other construction operations. The SHSO will provide health and safety monitoring to ensure that appropriate levels of protection and safety procedures are followed. The proximity of chemical, water, sewer and electrical lines will be identified by the FTL before any subsurface activity or sampling is attempted. Field personnel will keep within view of equipment operators at all times.

Proper containment and disposal practices will be followed in regard to the potential amount of waste generated during operations. The location of safety equipment and evacuation procedures will be established prior to initiation of operations according to this HASP. The use of hard hats, eye protection, and steel-toed boots will be required during excavation or other heavy equipment operations. Personnel will not be allowed to enter excavations greater than four feet deep without appropriate shoring and level of protection. Contaminated equipment will be placed on liner material when not in use, or when awaiting and during contamination. Communications with the Support Zone will be regularly maintained.

9.9.3 Sampling/Screening

Personnel must wear prescribed clothing, especially eye protection and appropriate gloves when sampling/screening. Sample bottles may be bagged prior to sampling/screening to ease decontamination procedures. The sampling team must be aware of emergency evacuation procedures described in this HASP and the location of emergency equipment, including spill containment materials, prior to sampling. Contamination avoidance will be practiced at all times. Personnel must use the buddy system and maintain communications with the Support Zone. In some situations, additional monitoring by the SHSO may be needed to confirm or establish the proper level of protection before the sampling team can proceed.

9.9.4 Sample Handling

Personnel responsible for the handling of samples will wear the level of protection described in Section 9.6. Samples will be identified as to their hazard and packaged to prevent spillage or breakage. Any unusual sample conditions will be noted. Lab personnel will be advised of high hazard levels and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or inclusion of a written statement with the samples. It may be necessary for the SHSO to review safety procedures in handling site samples to assist or assure that these practices are appropriate for the type of suspected contaminants in the sample.

9.9.5 Waste Disposal

Waste disposal operations will be monitored by the SHSO and performed under the appropriate level of personal protection. Personnel will wear the prescribed clothing, especially eye

protection and chemical resistant gloves, when handling or drumming waste materials. Contamination avoidance will be practiced at all times.

9.9.6 Additional Safe Work Practices

Refer to the SHSO for specific concerns on each individual site task. The safety rules listed below must be strictly followed:

- Smoking, eating, drinking, etc. are not allowed during site activities.
- Always use the buddy system.
- Practice contamination avoidance, both on and off site.
- Plan activities ahead of time.
- Do not climb over/under obstacles.
- Be alert to your own physical condition.
- Watch your buddy for signs of fatigue, exposure, heat or cold stress, etc.
- Report all accidents, no matter how minor, immediately to the SHSO or FTL.
- Always maintain line of sight.
- Minimize the number of ignition sources on site and locate those necessary to planned activities away from storage vessels containing flammable materials
- Maintain a vehicle for emergency use and familiarize personnel with directions to the hospital.
- Wash hands and face before eating and drinking, etc.

A work/rest regimen will be initiated when temperatures and protective clothing cause a stressful situation. Work will not be conducted without adequate light or without supervision.

9.10 Emergency Plan

As a result of the hazards on site and the conditions under which operations are conducted, the possibility of an emergency exists. An emergency plan is required by OSHA 29CFR 1010.120 to be available for use. A copy of the existing emergency plan for the plant will be available in

the Support Zone at each work site. In general, the emergency plan directs personnel to coordinate with existing plant emergency response and security personnel.

In the event of an emergency, the SHSO will call plant extension 2222, give their name and their location in the plant. The SHSO will inform the operator about the nature and type of emergency. The SHSO will implement the emergency plan whenever conditions at the site warrant such action. The SHSO will be responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel as necessary, and notification of emergency response units, and the appropriate management staff.

9.10.1 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of particulates, etc., an air horn will be sounded for approximately ten seconds indicating the initiation of emergency procedures. All persons in both the restricted and non-restricted areas will evacuate and assemble near the Support Zone or other safe area as identified by the SHSO. The Site Emergency Coordinator will have authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been sounded. The SHSO must see that access for emergency equipment is provided and that all combustion apparatus have been shutdown once the alarm has been sounded. Once the safety of all personnel is established, the facility fire department and other emergency response groups may be notified by the Plant Coordinator.

9.10.2 Potential or Actual Fire or Explosion

If the potential for a fire exists or if an actual fire or explosion occurs, the following procedures will be implemented:

- Immediately evacuate the area as described above
- Notify fire and police departments (Extension 2222)

Following this remaining personnel listed in the table below will be notified:

Type	Name	Telephone Number
Fire Department	Contact FLEXSYS Plant Coordinator	Ext. 2222
Emergency Response	Contact FLEXSYS Plant Coordinator	Ext. 2222
Police Department	Contact FLEXSYS Plant Coordinator	Ext. 2222
H&S/Environmental Project Manager	To Be Determined	To be provided
Contractor's Project Manager	To Be Determined	To be provided

9.10.3 Personal Injury

Emergency first aid will be applied on site as deemed necessary to stabilize the victim. Notify Emergency Response (Plant Extension 2222), as necessary.

The SHSO will complete an Incident/Injury Report. The OHSM and Project Manager(s) will be notified if the injury requires hospitalization or replacement of the injured worker.

9.10.4 Overt Personnel Exposure

If an overt exposure to toxic materials occurs, the exposed person will be treated on site as follows:

- *Skin Contact:*
  Wash/rinse affected area thoroughly with copious amounts of soap and water, then provide appropriate medical attention. An eyewash will be provided on site at the support zone. Eyes should be rinsed for at least 15 minutes upon chemical contamination.

- *Inhalation*
  Move to fresh air and/or, if necessary and appropriate, decontaminate and transport to the hospital.

- *Ingestion:*
  Decontaminate and transport to emergency medical facility.

- *Puncture Wound or Laceration*
  Decontaminate and transport to emergency medical facility. SHSO will provide medical data sheets to medical personnel as requested.

9.10.5 Adverse Weather Conditions

In the event of adverse weather conditions, the SHSO will determine if work can continue without sacrificing the health and safety of on-site workers. Some of the items to be considered prior to determining if work should continue are the following:

- Heavy rainfall
- Heavy snowfall
- Potential for heat stress
- Potential for cold stress and cold-related injuries
- Limited visibility
- Potential for electrical storms
- Potential for malfunction of H&S monitoring equipment or gear
- Potential for accidents

9.10.6 Heat/Cold Stress Problems

The OHSM, SHSO, and FTL will be familiar with signs of heat/cold-related problems and first-aid and treatment of related illnesses.

Heat stress can occur at ambient temperatures of 70°F and at lower temperatures if the worker is wearing personal protective equipment. The OHSM will establish procedures to prevent, evaluate, respond to heat stress and related conditions. The potential for heat stress or related conditions will be based on ambient temperature, humidity, percent sunlight, and protective gear being worn. Work cycle will be modified to prevent heat stress or related conditions, including requiring rest cycles and consumption of cool liquids. Protective gear will be removed during the rest cycle to permit total body cool down.

Adverse climatic conditions of cold are important considerations in planning and conducting site operations. Ambient temperature effects can include physical discomfort, reduced efficiency, personal injury, and increased accident probability.

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling. Areas of the body that have high surface-are-to-volume ratio such as fingers, toes, and ears are the most susceptible. Another potentially serious form of cold stress is hypothermia. Hypothermia results when the body loses heat faster than it can produce it.

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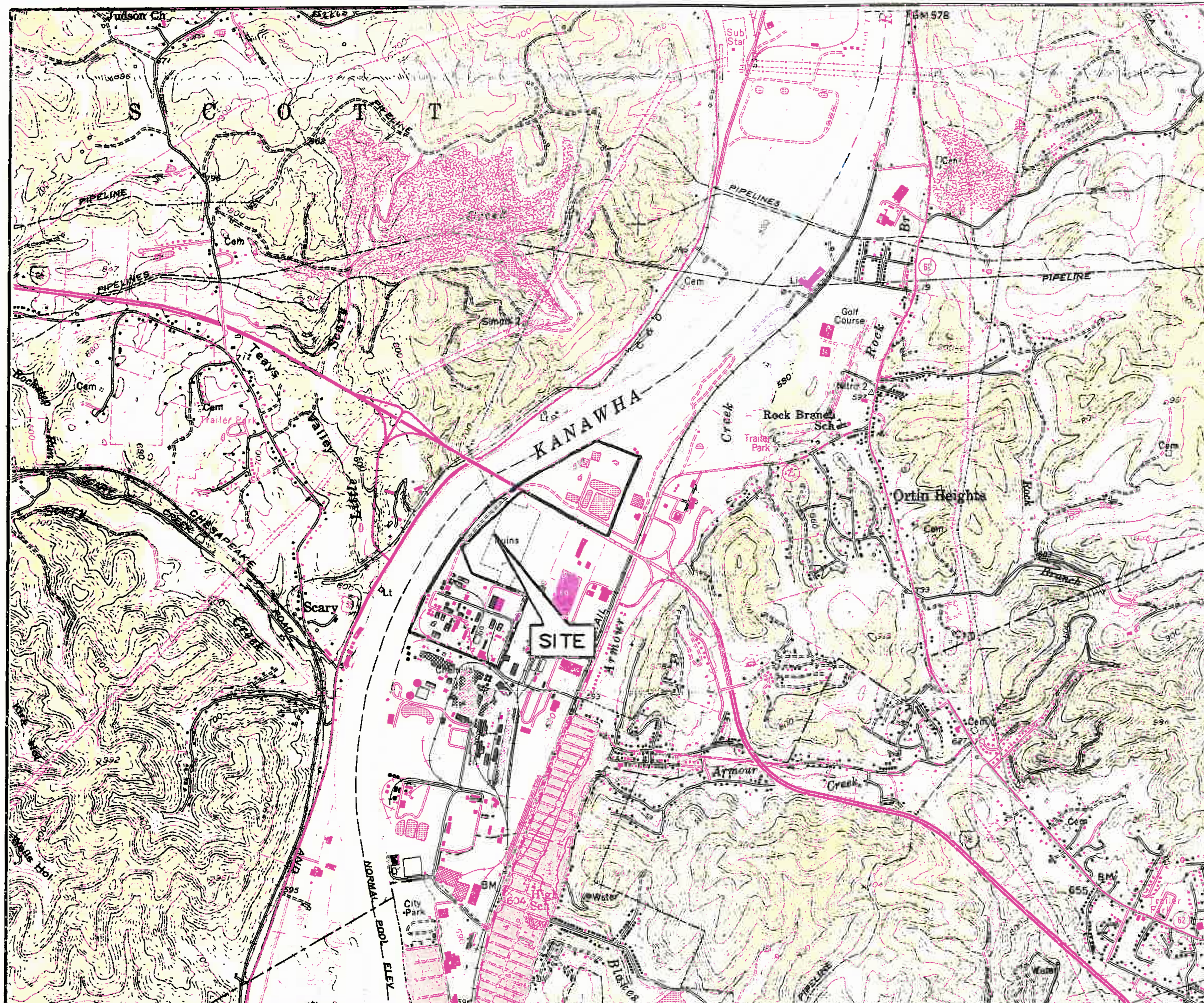
Smith, Seckman and Reid, Inc., 1995. "Scope of Work FLEXSYS Sewer Improvements", dated November 29, 1995 (as Revised December 18, 1995).

TABLES

Table 1. FLEXSYS Sewer Project - Initial Task Force Members.

Don Johnson	FLEXSYS Team Coordinator
Christine Weber	FLEXSYS ES&H Manager
Carl Adams	Advent Process Design Support
Chester Seaman	FLEXSYS Plant Team Member
Charlie Robinson	Advent Process Design Support
Bill McLaughlin	W.L. Hailey and Company, Inc. Construction Support
Rex Null	MTI Corporation Facility Infrastructure Support
Frank Offutt	MTI Corporation Facility Infrastructure Support
Randy Houston	W.L. Hailey and Company, Inc. Construction Support
Frank K. Smith	Smith, Seckman & Reid Design Project Manager
Steve Lane	Smith, Seckman & Reid Design Support
Holman Waters	Smith, Seckman & Reid Design Support
Robin Garibay	Advent NPDES Permitting Support
J. Mike Bowman	FLEXSYS Plant Team Member
Joe Clifford	Roux Associates, Inc. RCRA Permitting Support
George Naylor III	W.L. Hailey and Company, Inc. Construction Support
Anthony Tuk	Monsanto RCRA Project Coordinator
Jerry M. Schroy	Monsanto Regulatory/Permitting Support

FIGURES



N

SOURCE: U.S.G.S. SAINT ALBANS,W.VA., QUADRANGLE 1958
7.5 MINUTES SERIES (TOPOGRAPHIC)
PHOTOREVISED 1971
AND 1976

2,000' 0 2,000'

Title:

SITE LOCATION MAP

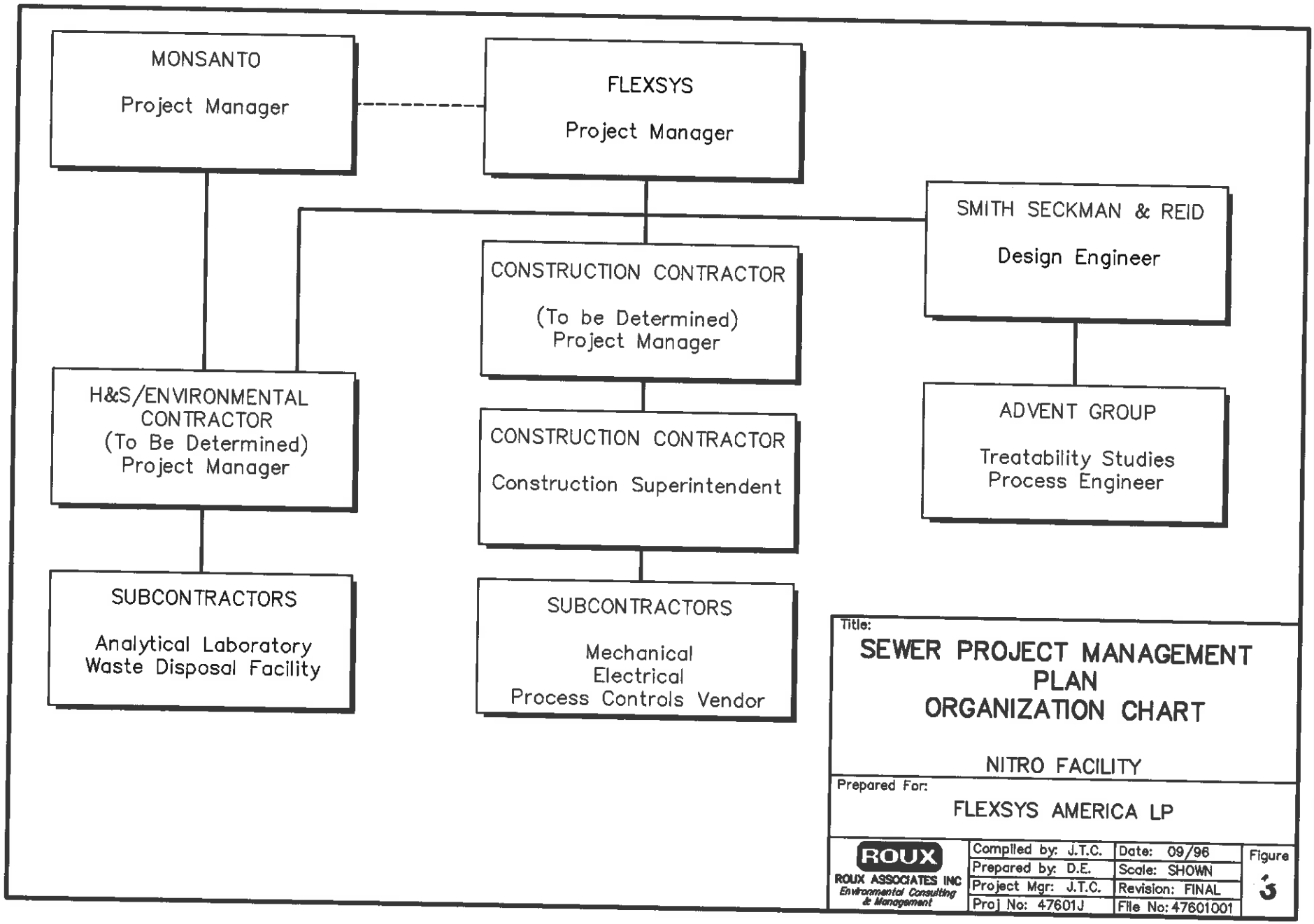
NITRO, WEST VIRGINIA

Prepared for:

MONSANTO COMPANY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: E.A.R.	Date: 09/93	Figure
Prepared by: A.M.B.	Scale: SHOWN	1
Project Mgr: M.S.T.	Revision:	
File No. 06619J		


MONSANTO
Project Manager
FLEXSYS
Project Manager
SMITH SECKMAN & REID
Design Engineer
CONSTRUCTION CONTRACTOR
(To be Determined)
Project Manager
H&S/ENVIRONMENTAL
CONTRACTOR
(To Be Determined)
Project Manager
CONSTRUCTION CONTRACTOR
Construction Superintendent
ADVENT GROUP
Treatability Studies
Process Engineer
SUBCONTRACTORS
Analytical Laboratory
Waste Disposal Facility
SUBCONTRACTORS
Mechanical
Electrical
Process Controls Vendor
Title:
SEWER PROJECT MANAGEMENT
PLAN
ORGANIZATION CHART
NITRO FACILITY
Prepared For:
FLEXSYS AMERICA LP
ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management
Compiled by: J.T.C.
Prepared by: D.E.
Project Mgr: J.T.C.
Proj No: 47601J
Date: 09/96
Scale: SHOWN
Revision: FINAL
File No: 47601001
Figure
3

APPENDIX A

PRELIMINARY DESIGN DRAWINGS

APPENDIX B

COMMUNITY RELATIONS FACT SHEET
RCRA SEWER STABILIZATION PROGRAM
FLEXSYS AMERICA LP
NITRO, WEST VIRGINIA

COMMUNITY RELATIONS FACT SHEET
RCRA Sewer Stabilization Program
FLEXSYS America LP
Nitro, West Virginia

FLEXSYS America LP (FLEXSYS) is conducting environmental improvements in accordance with the facility Resource Conservation and Recovery Act (RCRA) Corrective Action and Waste Minimization Permit (WVD 039990965) issued by the United States Environmental Protection Agency (USEPA) on November 2, 1990. A RCRA Facility Investigation (RFI) has been completed for site-wide soils, sediments, surface water, and ground water at the facility located on the east bank of the Kanawha River, one-half mile north of the city of Nitro, West Virginia. The purpose of the Sewer Stabilization program is to minimize the potential for release of hazardous constituents from the process wastewaters generated at the facility.

The Nitro facility comprises approximately 110 acres and is divided into two sections; the northern area containing the wastewater treatment facilities and the southern area containing the office and process areas. The existing Facility Sewer System conveys process wastewaters generated during plant production activities to the on-site Wastewater Treatment Plant. The Sewer Stabilization Program includes several project elements including: a new double-wall process sewer line with leak detection; extensive containment improvements in storage and loading/unloading areas; a waste minimization initiative; and improvements in the collection and segregation of the Specialty Products area.

The sewer projects will be implemented in phases in accordance with the Work Plan schedule previously approved by the USEPA. Questions regarding the planned activities should be directed to the following contact person:

Ms. Christine Weber or ES&H Manager
FLEXSYS
No. 1 Monsanto Road
Nitro, West Virginia 25143
(304) 759-4334

Status of the project implementation will be summarized in progress reports which are routinely submitted to the USEPA.

PLATES

N

SLUDGE THICKENER TANK
SECONDARY CLARIFIER
TERTIARY CLARIFIER
DIGESTER
ACTIVATED SLUDGE BASIN
CONTROL ROOM
LIMESTONE BED
BASIN A-3
EQUALIZATION BASIN
SURGE BASIN
EMERGENCY BASIN

WASTE TREATMENT STUDY AREA

RIVER
KANAWHA
INTERSTATE 64
RAILROAD
CONRAIL
ARMOUR CREEK

586
588

DRAINAGE SWALE
584
STORMWATER AND EQUALIZATION TANKS
FIRE WATER RESERVOIR
BLDG. 74
BLDG. 72
BLDG. 1
BLDG. 3
BLDG. 2
BLDG. 9
BLDG. 68
BLDG. 57
BLDG. 44
BLDG. 32
BLDG. 66
BLDG. 34
BLDG. 47
INCINERATOR
BLDG. 91
BLDG. 18
BLDG. 31
BLDG. 28
BLDG. 23
BLDG. 41
BLDG. 43
BLDG. 42
BLDG. 39
CONTROL ROOM
CENTER SCALE

PROCESS STUDY AREA

CONRAIL RAILROAD
WEST VIRGINIA STATE ROUTE NO. 25

WATER
570 580 585 590 596 594 592

LEGEND

586 — TOPOGRAPHIC CONTOUR LINE (FEET)
CONTOUR INTERVAL= 2 FT.
RIVER BANK CONTOUR INTERVAL= 5 FT.
BOUNDARIES OF STUDY AREAS
APPROXIMATE PROPERTY LINE
EDGE OF WATER
DRAINAGE SWALE
FENCE

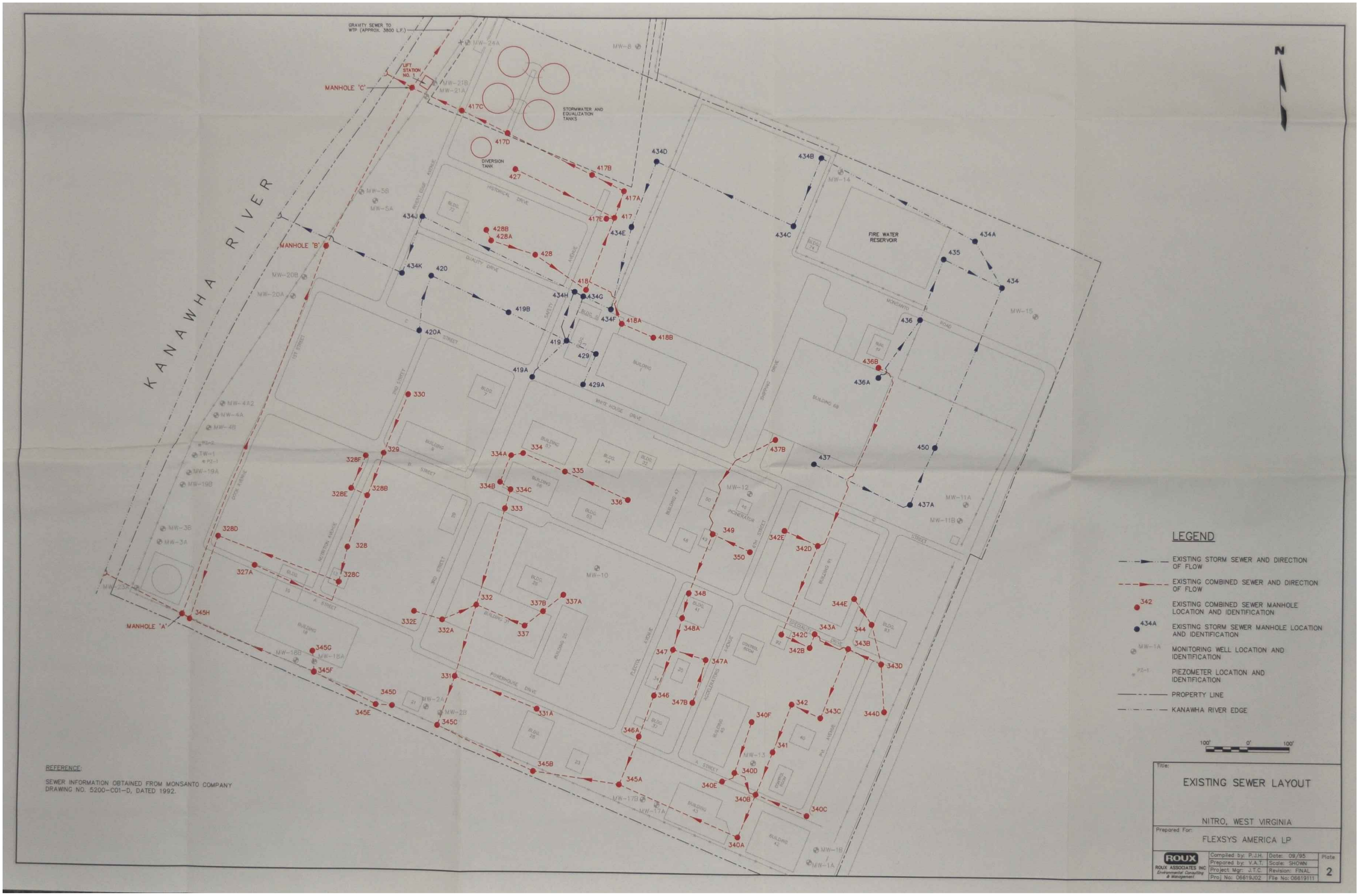
200' 0' 200'

Title:
SITE PLAN
NITRO, WEST VIRGINIA

Prepared For:
FLEXSYS AMERICA LP

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.H.	Date: 09/95	Plate
Prepared by: V.A.T.	Scale: SHOWN	
Project Mgr: J.T.C.	Revision: FINAL	1
Proj No: 06619J02	File No: 06619112	



REFERENCE:

SEWER INFORMATION OBTAINED FROM MONSANTO COMPANY DRAWING NO. 5200-C01-D, DATED 1992.

Title:

EXISTING SEWER LAYOUT

NITRO, WEST VIRGINIA

Prepared For:

FLEXSYS AMERICA LP

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.H.	Date: 09/95	Plate
Prepared by: V.A.T.	Scale: SHOWN	2
Project Mgr: J.T.C.	Revision: FINAL	
Proj No: 06619J02	File No: 06619111	

N

PROPOSED MAIN TRUNK PROCESS SEWER LOCATION 24" DOUBLE-WALL HDPE INSTALLED IN CRADLES ON GRADE

PROPOSED LIFT STATION LS-1B

EXISTING LIFT STATION NO. 1

PROPOSED BUILDING 47 PROCESS SEWER LOCATIONS 12" DOUBLE-WALL HDPE INSTALLED IN CONCRETE TRENCH

PROPOSED BUILDING 91 PROCESS SEWER LOCATION 12" DOUBLE-WALL HDPE IN 30" STEEL CASING INSTALLED VIA MICRO-TUNNEL

PROPOSED LIFT STATION LS-1A

PROPOSED BUILDING 34/41 PROCESS SEWER LOCATION 6" DOUBLE-WALL HDPE IN 30" STEEL CASING INSTALLED VIA MICRO-TUNNEL

PROPOSED MAIN TRUNK PROCESS SEWER LOCATION 16" DOUBLE-WALL HDPE IN 30" STEEL CASING INSTALLED VIA MICRO-TUNNEL

SLUDGE THICKENER TANK
SECONDARY CLARIFIER
TERTIARY CLARIFIER
DIGESTER
CONTROL ROOM
THICKENER BLDG
BASIN A-3
EQUALIZATION BASIN
SURGE BASIN
EMERGENCY BASIN
WASTE TREATMENT STUDY AREA
PROCESS STUDY AREA
RIVER
KANAWHA
INTERSTATE 64
CONRAIL RAILROAD
STATE ROUTE NO. 25
WEST VIRGINIA
ARMOUR CREEK
FIRE WATER RESERVOIR
STORMWATER AND EQUALIZATION TANKS
584
586
588
590

LEGEND

- 586 — TOPOGRAPHIC CONTOUR LINE (FEET) CONTOUR INTERVAL= 2 FT. RIVER BANK CONTOUR INTERVAL= 5 FT.
- BOUNDARIES OF STUDY AREAS
- APPROXIMATE PROPERTY LINE
- EDGE OF WATER
- DRAINAGE SWALE
- FENCE
- PROPOSED NEW PROCESS SEWER LINES BELOW GRADE
- PROPOSED NEW PROCESS SEWER LINES ON GRADE
- PRETREATMENT UNITS
- LIFT STATIONS
- LOADING AND UNLOADING AREA IMPROVEMENTS
- CONTAINMENT AREA IMPROVEMENTS
- PRINCIPAL PRODUCTION PROCESS UNITS
- EXISTING WASTEWATER TREATMENT PLANT

NOTES:

1. ALL NEW SEWER PIPING WILL BE SECONDARILY CONTAINED AND INSTALLED WITH AN INTEGRAL LEAK DETECTION SYSTEM.
2. THE SPECIFIED MATERIALS OF CONSTRUCTION ARE BASED ON CURRENT DESIGN CONSIDERATIONS. EQUIVALENT MATERIALS MAY BE SPECIFIED IN THE FINAL DESIGN PROCESS.

200' 0' 200'

Title:

NEW PROCESS SEWER SYSTEM CONFIGURATION AND LAYOUT

NITRO, WEST VIRGINIA

Prepared For:

FLEXSYS AMERICA LP

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: J.T.C.	Date: 08/96	Plate
Prepared by: V.A.T.	Scale: SHOWN	3
Project Mgr: J.T.C.	Revision: FINAL	
Proj No: 06619J02	File No: 06619127	

DETAILED SEWER STABILIZATION MEASURES PLAN
DATED NOVEMBER 27, 1996

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including, the possibility of fine and imprisonment for knowing violations.

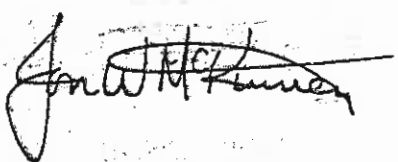
Permittee: Monsanto Company and Flexsys America L.P.

Permit No.: WVD 039990965

Facility Address: No. 1 Monsanto Road
Nitro, West Virginia 25143

Name: Jon W. McKinney

Title: Plant Manager, Flexsys

Signature: 

Date: November 25, 1996